MADRAS GOVERNMENT MUSEUM.

Bulletin, Vol. III, No. 2.

THE SEA FISHERIES

OF

MALABAR AND SOUTH CANARA.

With Seven Plates.

BY

EDGAR THURSTON,
SUPERINTENDENT, MADRAS GOVERNMENT MUSEUM.

Smithsonian Institution
SEP 15 1900
National Museum

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

[PRICE, 1 *rupee* 4 *annas.*] 1900. [2 *shillings.*]

Madras Government Museum Bulletins.

Vol. I.

No. 1.—Pearl and Chank Fisheries of the Gulf of Manaar.

No. 2.—Note on Tours along the Malabar Coast.

No. 3.—Rámésvaram Island and Fauna of the Gulf of Manaar.

No. 4.—Anthropology of the Todas and Kotas of the Nilgiri Hills; and of the Bráhmans, Kammálans, Pallis and Pariahs of Madras City.

Vol. II.

No. 1.—Anthropology of the Badagas and Irulas of the Nīlgiris; Paniyans of Malabar; Chinese-Tamil Cross; Cheruman Skull; Kuruba or Kurumba; Summary of Results.

No. 2.—Eurasians (Poorer Classes) of Madras and Malabar; Note on Tattooing; Malagasy-Nias-Dravidians; Toda Petition.

No. 3.—Kadirs of the Anaimalais; Malaiālis of the Shevaroys; Syllabus of Demonstrations; the Dravidian Head; the Dravidian Problem.

Vol. III.

No. 1.—Notes on some of the People of Malabar; Mala Védars of Travancore; Miscellanea.

MADRAS GOVERNMENT MUSEUM.

Bulletin, Vol. III, No. 2.

THE SEA FISHERIES

OF

MALABAR AND SOUTH CANARA.

With Seven Plates.

BY

EDGAR THURSTON,

SUPERINTENDENT, MADRAS GOVERNMENT MUSEUM.

MADRAS:

PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

1900.

SEA FISHERIES OF MALABAR AND SOUTH CANARA.

As an indication of the lines on which research might be advantageously carried out by a State Fishery Board, with a staff of men trained in modern technique at one of the marine biological stations, and competent to grapple with economic problems, and the study of physical science and applied marine zoology in their relation to the sea-fisheries of the Madras Presidency, I may with advantage preface my remarks by a reference to the scope of a journal, started under the auspices of the Russian Imperial Society of Fish Culture and Fisheries. The programme of this publication, which is a sequel to the International Fishery Congress held at Bergen in 1898, includes "new facts pertaining to fish and oyster culture (statistics, new methods used in fish-culture, inventions, etc.). New facts and data pertaining to fisheries (statistics, fishing news, inventions, new laws, etc.). Professional education of fishermen, and of workmen engaged in the manufacture of preserved fish. Novelties in the manufacture of fish products (new patents, new canneries, etc.). Improvements in the fish trade, and in the methods of carrying fish (fish-markets, cold-storage houses, refrigerator-cars; new duties on imported fish). The work of fishery-societies. Review of scientific investigations connected with fisheries. New books on fish-culture and fishing. Personal notes." With this comprehensive syllabus before the reader of the present report, it must appear thin and invertebrate. And I only claim for it that it has been prepared, amid manifold duties, from personal notes made during an inspection of the fish-curing yards of the western coast of the Madras Presidency.

It has been argued, with reference to the British fisheries, that the State should neglect no opportunity of mastering, through the agency of a duly qualified department, every detail, natural as well as artificial, of the fishing industry;

and might do much, apart entirely from 'protection' and 'encouragement' of the fishing industry. In the absence of a Fishery Board, the vast fish-curing operations, which are carried on throughout the littoral of the Madras Presidency, both on the west and east coasts, washed respectively by the waters of the Arabian Sea and Bay of Bengal, are at the present day supervised by the Salt Department. And departmental interest is mainly centered in the supply of Government salt to the fish-curers, and the prevention of theft and smuggling thereof. It has, however, been laid down as a principle that "there is no intention of making the fish-curing industry a source of revenue. It is sufficient if Government is enabled to encourage it without cost, and this is so."

The administration of the Salt Department is carried out by a Commissioner, selected from the senior ranks of the Civil Service, who, with the assistance of a Secretary, controls the following establishment :—

——	No.	Scale of pay.
Deputy Commissioners.	4	3 on Rs.1,200 to Rs. 1,400 each; 1 on Rs. 800 to Rs. 1,000.
Assistant Commissioners.	15	2 on Rs. 800 each. 3 on Rs. 600 each. 4 on Rs. 700 each. 6 on Rs. 500 each.
Inspectors ..	79	11 on Rs. 400 each. 21 on Rs. 300 each. 17 on Rs. 350 each. 30 on Rs. 250 each.
Assistant Inspectors.	111	35 on Rs. 175 each. 40 on Rs. 125 each. 36 on Rs. 150 each.
Sub-Inspectors ..	832	74 on Rs. 70 each. 207 on Rs. 40 each. 101 on Rs. 60 each. 297 on Rs. 30 each. 153 on Rs. 50 each.

To which establishment must be added a host of peons,[1] petty officers, and menial servants.

For the fish-curing yards of the west coast (Malabar and South Canara), the following establishment is allotted, in accordance with the magnitude of the operations carried on :—

(1) For yards selling less than 1,500 maunds[2] of salt per annum.	1 petty officer. 1 second-grade peon.
(2) For yards selling more than 1,500, but less than 3,000 maunds.	1 petty officer. 2 second-grade peons.
(3) For yards selling more than 3,000 maunds.	1 Sub-Inspector. 1 first-grade peon. 2 second-grade peons.

For admission into the department, a test of physical fitness is required. And the rules lay down that:

> No persons shall be appointed (either permanently or temporarily) to any office in the department, who are under 18 or over 25 years of age, and who are not at least 5 feet 5 inches in height and 32 inches round the chest. In the case of non-commissioned officers, and soldiers of the Native Army, pensioned or discharged with good characters, the rules as to age may be waived. As a rule, however, it will be well not to take in men over 40 years of age.
>
> The appointment of Brahmins as petty officers or peons is prohibited, save under the special sanction, in each case, of the Commissioner. (One of the chief reasons is, I believe, the objection of Brahmins to drill alongside men of inferior caste.)
>
> The pay of the Sub-Inspectors of the lower grades being too low for the maintenance of Europeans and Eurasians in decent comfort and freedom from temptation, their appointment to the fourth and fifth grades, and to lower classes, is prohibited save under special sanction.

As defined in a text-book of chemistry, salt is stated to be sodium chloride (NaCl), which occurs as rock-salt in large

---

1 "Peon meaning a footman. In the sense of 'orderly,' peon is the word usual in South India. The word is likewise employed very generally for men employed on police service."—*Yule and Burnell, Hobson-obson.*

2 Throughout this report the maund must be taken as being 82$\frac{6}{7}$ lbs. averdupois.

deposits in various geological strata, in solution in sea-water and brine springs, and, in small quantities, in all running water. For the purpose, however, of the administration of the Salt Department, a more elaborate definition is necessary. And the Madras Salt Act (Uppu Act), 1889, lays down that:

(*a*) "Salt" means chloride of sodium, and includes swamp salt, spontaneous salt, and salt or saline solutions made or produced from any saline substance or from salt-earth.

(*b*) "Saline substance" means any substance naturally containing salt.

(*c*) "Contraband salt" means salt, saline substances, salt-earth, or saltpetre manufactured without licence, or dealt with by any person in contravention of any enactment for the time being in force, or of any order, permit, or licence issued thereunder, or of any rule made in pursuance thereof. But it shall not include salt-earth which has been merely excavated or collected, unless such salt-earth is found within the limits of any local area, wherein such salt-earth is declared by a notification of the Governor in Council to be contraband salt, nor shall it include sea-water.

In fear of being dealt with by law for criminal possession of salt, a member of my staff recently applied to me for special sanction of Government to permit him to make a solution of picric acid in sea-water for the preservation of sea-weeds!

It is not surprising that, in yards placed in charge of men in receipt of small salaries, and entrusted with the care and disposal of a saleable commodity bearing a distinct market value outside the precincts of the yard, and with the distribution of salt to the fish-curers, who, at times of big catches, are naturally anxious to obtain possession of the curing agent with the least possible delay, the temptation to commit theft and levy black-mail sometimes gains the upper hand. And, as specimens of mild departmental offence and fraud, the following cases may be cited:—

Petty officer reduced for suspicious irregularities in keeping the fish-curing books.

Petty officer suspended for carelessness in issuing salt to curers.

Petty officers dismissed, degraded, and prosecuted for not being able to account satisfactorily for salt found in their houses.

Petty officers reduced for irregular distribution of salt to fish-curers under suspicious circumstances, and for allowing the removal of dried fish before weighment.

Sub-Inspector made to pay cost price and duty on several maunds of salt found short in the stock at one of the yards.

In connection with 'the wickedness of the people,' I may quote the following note, prepared for me by an Assistant Commissioner: "The sins of the fish-curers are generally petty, unless the yard officer connives with them, in which case serious irregularities in connection with the disposal of salt may naturally be expected to go on. It is undoubtedly a fact that there is more temptation to dispose of Government salt on the east than on the west coast. On the former, similar salt is sold in the local bazárs, and the yards are in charge of petty officers; whilst, on the west coast, Bombay salt, which is in much larger crystals and lighter in colour than Madras salt, alone is sold locally. Besides which, the yards are, for the most part, in charge of Sub-Inspectors, and a larger staff of peons is employed.

"The sins, when the curers and establishment combine, consist firstly of passing out bags of salt from the fish-curing yard, when operations are heavy, or when the whereabouts of the migratory circle officers is well known; secondly, of issuing excess salt to curers, who either use old brine, or get salt in quantities sufficient for big fish, when they only have small fish to cure. This is, no doubt, the commonest form of fraud in vogue. To check it, inspecting officers are required to pass out dry fish, and note the percentage of dryage. And, in order to admit of this being done, each curer keeps his fish separate, and covered by a ticket showing the date of its admission into the yard. These tickets are stuck up against each consignment of fish, to admit of a check being possible. Other minor checks are employed, *e.g.*, gate note-books, in which the quantity of fish brought in is noted by the peon. And, once a quarter, the local range Sub-Inspector is required to take charge for two or three days; and the results obtained by him in dryage and quantity of salt issued are compared with the yard officer's results. On the west coast, when operations are very heavy, the establishment is, no doubt, at times inadequate. Advantage is undoubtedly taken of this

to collect from four to eight annas per bag of salt from the curers, who doubtless pay the same, knowing that they thereby obtain certain unauthorized privileges when catches are heavy, and night curing is a necessity. It is needless to observe that everything is done to check this. But, as long as both parties agree, it is impossible to prove anything. It must be remarked that, on the west coast, this system of 'tips' pays the yard officer better than running the risk of passing out salt which is unsaleable.

"The remaining sins of the curers consist chiefly of throwing away stale brine in their sheds, of using part of it, and surreptitiously removing small quantities of salt thus saved for home consumption.[3] On the whole, the west coast curers are very amenable to discipline, and there is little to complain of about them in connection with conservancy arrangements."

As examples of the mild wickedness of the fishing community, the following extracts from the Salt Department reports may be cited :—

Sadras yard.—Owing to a strike among the fish-curers against the enforcement of an essential rule to keep fish in the yard for at least 36 hours, the yard was ordered to be temporarily closed.

Drying fish at home, after soaking it in sea-water, was adopted by some of the Vizagapatam fishermen, with a view to evade payment of the cost of salt. This practice, which was growing rapidly, received a check by the prosecution of many of the offenders under the Municipal Act, as it is of necessity noisome.

Thalai yard temporarily closed owing to the refractoriness of the curers in refusing to pay rent for the use of the yard, and to keep the buildings and fences in proper repair.

For some years a section devoted to fish-curing experiments appeared in the annual reports of the Salt Department. These experiments seem to have been mainly carried out, on a modest scale, with a view to the introduction of improved methods of curing, and the creation of a taste among the fish-eating community for a superior article. Great difficulty appears to have been experienced in purchasing fish of the

---

[3] Excluding the salt sold for export, and supplied to the French Government and for fish-curing, the quantity of salt passed into consumption in the Madras Presidency during 1897–98 was 8,379,313 maunds.

FISHING VILLAGE, CANNANORE.

better kinds in sufficient quantities to admit of experiments being made on a large scale, because it was necessary to purchase from the traders, and not from the fishermen, who refused to sell, as they were, in return for advances of money, under engagement to deliver all the fish caught to the traders. In the half-yearly report of the Salt Department, 1884, I read, however, that " though no very large experiments were made with improved methods of curing, such as were made proved fairly successful. At two yards in the Calicut circle, 262 maunds of fish were dealt with, and the price realised in both cases was 8 annas a maund in excess of that realised for fish cured in the ordinary manner. The price would, no doubt, have been higher, had the fish experimented on been of the finer kinds, instead of shark and cat-fish. Another experiment, conducted by Mr. Inspector Beeson at Kistnapatam in the Nellore district, was more successful. The fish cured in the course of this experiment were sent by Mr. Beeson to Madras, and realised a profit of about 33 per cent., which was very satisfactory. The fish cured in the improved manner is reported to be eagerly bought, and a trader in Madras has offered to purchase any quantity that may be available. No doubt, the curers will in time find out that it will pay them to take more trouble, where a market can be found for a better article, that is, in the neighbourhood of large towns. The lower classes appear indisposed at present to pay more for fish cured in a superior, and therefore more expensive manner."

In the report, 1884–85, it is stated that " the experiments made by officers of the department, with the object of teaching the fishermen better methods of curing, have not been very successful. In most places it has been found difficult to procure fresh fish with sufficient regularity, and at reasonable prices, and to arrange for a ready sale. The experiments of one or two officers have, however, been exceptions to the general rule, and have not only raised the standard of fish-curing in the neighbourhood, but have proved that better and more costly methods may be made actually more profitable than the old careless treatment of the native fishermen. Whatever be the cause to which the improvement is due, there is no doubt that a much better article is now turned out than hitherto, especially on the west coast, where the fishermen seem to have little to learn from us in the way of producing a sound, marketable article of the common sort. There is, of course, no demand for delicacies in the way of

cured fish, such as find a ready sale in Europe at remunerative prices." In a further report (1884–85), the Salt Commissioner expressed his opinion that "the curers have very little to learn from us, as they already adopt varying methods to suit the requirements of the different markets which they supply. I have frequently eaten in my own house salted fish from the west coast bought in the bazár at Ootacamund, and can testify to its excellence."

As I have pointed out elsewhere,[4] in the British trade different kinds of fish are distinguished by the terms 'prime' and 'offal'; and, as the names imply, the former are consumed by the richer, the latter by the poorer classes. In India, even more than in Great Britain, the fish supply is essentially a poor man's question, and the prosperity of the fishing industry depends largely on the offal, and not on the prime, though, as will be seen hereafter, large quantities of seir and mackerel are exported by coasting steamers. In the City of Madras, the 'microscopic minority' of Europeans, who are regular fish-eaters, will go on year after year without seeing at their table any other fish, out of the large variety which is sold in the Madras fish-market, than seir (several species of *Cybium*), pomfret, white, silver, grey, or black [5] (*Stromateus sinensis*, *S. cinereus* and *S. niger*); the so-called whiting (*Sillago sihama*); and perhaps an occasional flat-fish (*Psettodes erumei*), which is a poor substitute for a Torbay sole. During three years' residence in Calcutta I only saw served up hilsa (*Clupea ilisha*), which, though bony, is excellent when smoked; begti (*Lates calcarifer*, the nair fish); and the mango fish or tupsee muchee (*Polynemus paradiseus*), which comes up the Hooghly river for spawning purposes in very large numbers. Again, at Cochin, out of about forty different kinds of fish classed as edible by the native community, which were being caught at the time of my visit, only four were considered fit to place before me, viz., seir, whiting, mullet, and "sardines."

To return to fish-curing experiments. In 1893 the Board of Revenue, having from time to time observed that the fish-curing experiments conducted by the Salt Department have had no effect in inducing curers to adopt improved methods of curing, requested the Deputy Commissioners to consider and report on the advisability of continuing them. They

---

[4] Bulletin No. 2, 1894: Note on Tours on the Malabar Coast.

[5] Silver pomfret is the immature, and grey pomfret the adult *Stromateus cinereus*.

were unanimously of opinion that the conduct of these experiments was a mere waste of valuable time, inasmuch as the curers were in no way influenced by them, and adhered to their own methods of curing. The experiments were, therefore, ordered to be discontinued.

In 1897 the Board, in a resolution on the subject of fishery investigations, stated that "in 1884 orders were given for the record of the quantities of each of the most common kinds of fish, such as sardines, sharks, mullet, cat-fish, etc., brought to each yard for curing, and Inspectors were directed to issue instructions, with reference to local circumstances, as to the descriptions of fish which should be entered. These instructions not having been attended to carefully in some yards of the southern division, the Assistant Commissioners were further informed, in 1886, that the object of insisting up on the scientific classification of the fish brought to the yard was to gain some knowledge of the habits of the most valuable kinds of fish, and of the movements of shoals, and that accurate particulars of the takes of the most valuable descriptions of fish, or of those most abundantly caught, would be of far more value than doubtful statistics regarding many different kinds. . . . . It appears probable that the information compiled by the officers in charge of fish-curing yards is vitiated to a great extent by the fact that the various kinds of fish have different names,[6] under which they appear in different circles, rendering comparison difficult, if not impossible.

The Board, therefore, resolved to forward to the Assistant Commissioner of each coast sub-division a copy of the list received from the Superintendent, Government Museum, containing Latin, English, and vernacular names of the chief kinds of fish, and reference to the illustrations contained in Day's "Fishes of India."

In response to a request from the Board of Revenue, in 1898, that I would draw up a draft of instructions to officers in charge of fish-curing yards for the record of such information regarding the movements of migratory fishes round the coast as would, in my opinion, be most valuable, the following letter was submitted :—

---

[6] Five Dravidian languages are spoken on the coast of the Madras Presidency, viz., Tamil and Telugu on the east coast, Malayalam, Kanarese and Tulu on the west.

Fishery Investigations.

In returning the papers and map relating to fish-curing forwarded to me for consideration, I may state at the outset that I entirely agree with the statement that it is of importance to gain some knowledge of the habits of the most valuable kinds of fish, and of the movements of shoals, and that accurate particulars of the takes of the most valuable descriptions of fish, or of those most abundantly caught, would be of more value than doubtful statistics regarding many different kinds.

It should, as Mr. D'Arcy Thompson recently expressed it, be the primary object of all marine researches, whether hydrographical or biological, undertaken by National Institutions or by the Central Organisation, "to estimate the quantity of fish available for the use of man; to record the variations in its amount from place to place and from time to time; to ascribe natural variations to their natural causes; and to determine whether, or how far variations in the available stock are caused by the operations of man, and, if so, whether, when, or how measures of restriction and protection should be applied." (Conférence internat: pour l'exploration de la mer, Stockholm, 1899; the proceedings of which might with advantage be studied by any who are interested in Indian sea-fisheries).

2. What is really wanted is, as Professor Ray Lankester has expressed it, "a specially detailed knowledge of the life-history of those species of fishes which are valuable to man, and are the subject of fisheries; a knowledge of their food, and its history in detail; of their enemies in the shape of other fishes, birds, &c., which prey upon them and their young; a knowledge of their parasites, injurious or harmless, and of their diseases. Such knowledge may be termed the special biology of economic fishes."

3. In this connection I may quote from a prize essay on "The Relations of the State with Fishermen and Fisheries," London Fisheries Exhibition, 1883. Mr. C. E. Fryer therein states that "only the most careful and continuous investigation will discover the manifold laws of nature, which govern the migrations of fish, their spawning times and places, their development, the nature of their food, and all the other secrets of their economy. If, when the fishermen are lamenting the absence of the accustomed shoals of herring on their coasts, and fruitlessly throwing the blame on their

neighbours, the State could step in with the assertion that the fish had disappeared because of certain conditions, either of temperature, of food, or of currents, which the fishermen could hardly be expected to take cognizance of, and could tell them where they, or others like them, could be found, it would be giving the most substantial form of encouragement to the fisheries. Norway and the United States have taken the initiative in thus combining scientific research with practical administration in a single department, charged with the superintendence of the fishing industries. "

4. I am asked to draw up a draft of instructions to officers in charge of fish-curing yards for the record of such information regarding the movements of migratory fishes round the coast as will, in my opinion, be most valuable. Bearing in mind that the instructions are for petty officers, in the receipt of small pay, for the most part ignorant of English, and incapable of appreciating subtle specific characters, I would suggest that, as an initial experiment, detailed observations should be carried out in connection with the following well-known, but economically important species of fishes, and information concerning them collected for a provisional period of two years, commencing, if possible, at all fish-yards in the Presidency, synchronously with the renewal of fishing operations on the west coast after the present south-west monsoon :—

Clupea ilisha, sable fish or hilsa.
Clupea fimbriata, " sardine."
Clupea lile, " sardine."
Clupea longiceps, oil " sardine " (synonym, Sardinella neohowii).
Cybium guttatum, seir.
Cybium commersonii, seir.
Stromateus sinensis, white pomfret.
Stromateus cinereus { grey pomfret (when adult). silver pomfret (when immature).
Stromateus niger, black pomfret.

5. I shall be glad, if the Board so wishes, to take charge of, work up, and summarise the information obtained, and suggest hereafter, in consultation with the Board, such modification of the list of fishes to be kept under special observation as may seem most desirable.

6. It will be observed that I have included among the fishes the several species of " sardines "—all, it may be noted,

belonging to the Clupea or herring family—which are the source of the fish oil industry and fish-manure. And their investigation seems to me of primary importance. The main practical questions which remain to be solved in connection with the "sardines," are the reasons which attract them to our coast, where they spawn, and where they go to when they depart thence. Fishing in the open sea with a steam-tug to enable the boats to get to and from the fishing ground in spite of contrary winds, and readiness on the part of the fishing community to follow the movements of the fishes to greater distances than are possible under existing conditions, would probably lead to more prosperous and lucrative results. In an article on "the Natural History of the Herring" it has been pointed out that "it has been observed, on the east coast of Scotland, that the inshore fishes—say within the three mile limit—are subject to very great fluctuations, and that at distances of thirty, fifty, or seventy miles from the land, there is a far greater surety of encountering the shoals. When successful, however, the inshore fishing is by far the heaviest; and nets are far more liable to be broken or lost through overloading near the land than at a distance out. The obvious explanation is that the vanguard of the shoal finds itself confronted by the land, and pulls up, while the main body are still pushing forward, and thus a concentration of the forces takes place." The passage is quoted, as it can be applied to the Malabar herrings or "sardines."

7. The main practical object to be kept in view in connection with the fishes to be specially studied, seems to me to be the acquirement of a complete natural history of the migratory and other economically important fishes. This would involve a complete acquaintance with the species of fishes, shell-fishes, crustacea, (crabs), fish eggs, &c., on which they feed, and with the conditions under which these species flourish and multiply (close inshore, on the surface, on the bottom, in the deep sea, etc.). The movements of migratory fishes are, it may be noted, largely influenced by search for food and the reproductive impulse. The stomachs of the fishes should, therefore, be examined, and the nature of the contents (or their empty condition) recorded, and samples of the various contents preserved, when possible, for examination by some one competent to identify them. The food of fishes is, as Mr. Yarrell has pointed out, very different at different periods of the year, and this may be one of the causes, among others, of the particular excellence of the flesh

of some species of fishes at particular seasons. The reproductive organs should be examined with a view to ascertaining whether the males are full of milt and the females of roe. This can easily be determined by slitting the fish open on the lower surface from the vent or anal orifice, and examining the "guts." It has been noticed that, along the Coromandal Coast, "sardines" (Clupea longiceps) are rarely fat as in Malabar. In the case of sharks and skates (rays) the cavity of the uterus (womb) should be examined for the presence therein of embryoes (young), and their number and size recorded. Further, the dates of arrival and departure, and the magnitude of the shoals should be carefully recorded, and the wind force and direction, and the condition of the sky (dull, heavy, or unclouded sunshine) and water (clear, disturbed, or muddy) should be noted. It might also be ascertained whether the fluctuations of the fishery for a particular migratory fish follow a definite periodicity or cyclical order at a particular locality, with regular periods of recurrence and disappearance of the most important migratory fishes. Moreover, the time of day most suitable for fishing under ordinary conditions, *i.e.*, in the absence of shoals, and the reason of the preference for a particular time, should be noted. It is well known that fishes, and other marine animals, seek deep and cool water in the heat of the day, and rise to the surface at early morn, and as evening sets in. It would also be advantageous that the various fishes, large and small, which are present in greatest abundance synchronously with the arrival of a big shoal, should be recorded, as indicating not only a possible source of attraction to the coast, but also the species which are in pursuit of the shoal for food. During a sojourn at Calicut I was much impressed with the immense slaughter of small fishes by men fishing from the beach with cast-nets; piles of these small fishes being left on shore as food for birds, &c., after the selection of the bigger fishes which were required for the family evening meal.

8. In the event of any doubt or difficulty arising in connection with the identification of the fishes which are to be specially examined, or others, I would suggest that, as has been repeatedly done in the past, salted and sun-dried specimens should be sent to me, with their local vernacular name attached, for identification. If this course is adopted, confusion, and the record of erroneous, and consequently valueless information, may be avoided.

9. I would suggest that, with a view to a comparison being made of the fishes caught off the east and west coast—viz., the littoral fishes of the Bay of Bengal and Indian Ocean—a census should be held and record prepared, at each fish-curing yard, showing the names and relative abundance of the fishes caught during two entire weeks of the year, one before, the other towards the close of the south-west monsoon. Probably the end of February or early March, and the end of September or early October, would be found to be suitable as regards weather round the entire coast of the Presidency. But the exact dates could be fixed by one of our authorities on meteorological conditions.

10. Attached to this note is a specimen form (Table 1) for the record of observations on the lines indicated, and it would be well that, if my suggestions as to the special line of investigation are accepted, paragraphs 7 and 8 should be converted into Tamil, Telugu, Canarese and Malayalam, so that they may be intelligible to the petty officers responsible for the observations, and maintenance of the records. It is to be hoped, however, that officers of higher grades will take an active interest in the enquiry, and assist its practical outcome by the upkeep of notes and records of personal observations, in amplification of the stereotyped information contained in the columns of the official form.

The suggestions contained in this letter were approved by the Board of Revenue, which passed the following resolution relating to it :—

TABLE 1.

Suggestion for Form to be maintained in connection with Fishes held under special observation.

Date.	Name of fish.	Distance from shore at which caught.	Depth at which caught— surface or deeper water.	Time of day at which caught.	State of weather— sky, wind, sea.	Net used.	Small or big catch —maunds.	All or majority full-grown or young.	Stomach contents.	Milt and roe abundant or no; young in womb.	Sale-price, fresh; salted.	Other fishes most plentiful in the yard.	Other points which may occur to the observer.
1	2	3	4	5	6	7	8		10	11	12	13	14

1. The fish-curing statistics, as at present collected, having proved themselves to be valueless either scientifically or commercially, the Board resolves to put a stop to their record, and to substitute a less ambitious, but more accurate system on the lines suggested.

2. This record will be for the present experimental, and for a period of two years only; and the nine kinds of fish enumerated in paragraph 4 of the letter will alone be dealt with.

3. The record will be written up day by day by the officer in charge of the yard in the form attached. A sub-circular order, giving instructions for the filling in of each column on the lines indicated in paragraph 7 of the letter will be issued in the vernaculars, accompanied by illustrations of the fishes, whose characteristics are to be studied. The Inspectors should start the record themselves, or, if this is impossible, should send an Assistant Inspector to do it. And the Inspector or Assistant Inspector who does it should continue the work, until he is certain that the petty officer in charge of the yard thoroughly understands what is required of him. Only intelligent officers should be posted to the yards, and no changes should be made that can be helped. On occasions when large catches are expected, a senior Sub-Inspector (who should be specially selected for this duty) should be sent to the yard for a week or two, to assist in making the record. The same Sub-Inspector should be deputed to superintend the census. This should embrace not only the catches brought to the yards, but, so far as is possible, the catches of all the fishing villages in the circle, officers being specially deputed to them for the purpose.

By order of the Board of Revenue, it had to be fully explained to the fishermen, if they were shy of giving information, that the enquiries are made purely in their own interests. At the fish census, 1889, the officer, who was told off to make the record of fishes brought ashore, was at first driven away by the fishermen, who refused to give him the requisite information, from fear that the census was being taken with a view to increased taxation.

Fish-curing operations are carried on, in the Madras Presidency, in nine sub-divisions, of which eight are situated on the east, and one (Calicut) on the west. And the great economic importance of the Calicut sub-division, *i.e.*, the fisheries of the west coast, is very clearly brought out by the

FISHING BOATS, CANNANORE.

appended statistical statement (Table II) of operations during the financial year 1897–98 :—

TABLE II.

Fish-curing Operations in the Madras Presidency,
1897–98.

—	Number of yards.	Weight of fish brought for operation.	Weight of salt sold.	Value of salt sold.
		MDS.	MDS.	RS.
Chicacole	34	122,526	11,036	7,007
Cocanada	5	36,580	4,706	2,939
Masulipatam	5	8,599	1,428	736
Nellore	9	34,701	4,563	1,977
Chingleput	7	35,324	4,568	1,810
Cuddalore	3	7,926	1,019	509
Negapatam	10	28,492	4,650	2,269
Tinnevelly	12	48,554	7,169	3,776
Calicut	43	856,235	118,583	1,08,465

The importance of the west coast operations is still more clearly brought out by the following table, in which the aggregate results of the east coast sub-divisions are compared with those of the Calicut sub-division during the same year :—

	Eight East Coast Sub-Divisions.	Calicut.
Number of yards ..	85	43
Weight of fish brought for operation ..	Mds. 322,702.	Mds. 856,235.
Value of salt sold ..	Rs. 21,023.	Rs. 1,08,465.
Weight of salt sold ..	Mds. 39,139.	Mds. 118,583.

The figures speak for themselves, and require no explanation. Suffice it to notice that, with half the number of yards, the outturn of fish in the Calicut sub-division exceeded that of the east coast by 533,533 maunds.

The fish-curing yards of the Calicut sub-division, which includes the Malabar and South Canara districts, are situated on the exposed littoral of the Arabian Sea, and are divided, for administrative purposes, into five groups or circles, viz., from north to south, Udipi, Mangalore, Tellicherry, Calicut, Ponnáni. Of which the most important is Ponnáni.

The economic fishes comprise (*a*) round fishes, *e.g.*, seir, herrings, mackerel; (*b*) flat-fishes (*e.g.*, the so-called 'sole'); (*c*) cartilaginous fishes—sharks and rays (skates)—which are of far greater importance than in British fisheries, and take a leading place. The sharks and skates are known as pal sora, or milk producers, and, when salted, are considered very good for women nursing infants. Even the stomachs and intestines of sharks and skates are sold in the market to the lower classes. The shark *Chiloscyllium indicum* is called in Malayalam oodumbu shiraval, *i.e.*, Varanus shark, from the resemblance of its skin to that of the lizard *Varanus bengalensis*.

Fluctuations in fishery operations from year to year are due to many causes, among which may be noted absence of shoaling fishes, unfavourable seasons, *e.g.*, heavy rain and rough weather out of the normal season, cholera, etc. But on this point I may call in the evidence of the Salt Department reports.

Masulipatam division, 1884–85.—Comparative failure appears to be due to the want, along the coast of the Godávari and Kistna districts, of a fishing population provided with adequate appliances for the capture of a larger quantity of fish than can be consumed locally while fresh.

Negapatam division, 1884–85.—Heavy decreases due to five yards having been more or less damaged by the cyclone and rains of the last monsoon. Increase in the proportion of salt issued to fish cured due, in the Adirámpatnam Circle, to the extravagant and wasteful method of curing adopted by the fishermen, namely, sprinkling the fish with salt, and shaking the latter off before the removal of the fish. The fishermen, it would appear, decline to use the refuse salt a second time for fear of maggots, and prefer its periodical destruction by the Inspector.

Central division, 1884–85.—The Tellicherry yard caught fire, and had to be pulled down. The huts, in the Indian fish-curing yards, are not solid brick and masonry structures, but largely constructed of bamboo and thatch, which, in the dry season, rapidly burst into a blaze when they take fire.

Calicut sub-division, 1890–91.—Decrease attributed to (1) the Ratnagiri curers (from the Bombay Presidency) having left the Deria Bahadargur yard earlier than usual owing to closer supervision, which has lately been exercised over them, and which (accustomed as they had been to a wasteful process of curing) they found to be very irksome; (2) to a temporary strike among the curers at Gangoli, owing to certain orders issued by the Inspector; (3) to the fish having been found, in the early part of the season, to be infested with an internal parasite, which considerably checked the consumption of the article. The decline in operations at Quilandi was attributed to the difficulty felt in landing fishing boats at low tide, owing to the formation of a mud-bank near the sea-shore. The decrease at Pudiappu was due to the prevalence of small-pox and cholera.

In connection with the occurrence of endo-parasites in fishes, it will be a consolation to fish-eaters to know, on the authority of Cobbold, that "all our marine fishes have entozoa, but probably none of them are injurious to man in India. They need create no scare. Examine any well-grown salmon, trout, pike, etc., and probably any of them will contain at least three different kinds of parasites, each of which will be present in more or less considerable numbers. The presence of worm guests, therefore, does not imply any previous or present diseased condition of the host."

In 1884, Brigade-Surgeon G. Bidie, then in charge of the Museum, sent to Doctor Günther some specimens of entozoa found parasitic in some of the edible bony fishes of Madras (catfishes, seir, pomfret, etc.), whereon Professor Jeffrey Bell writes:[7] "Their prevalence, or alleged prevalence, had given rise to one of those epidemics of disquiet, which are best allayed by scientific knowledge and investigation." The specimens were forwarded for examination to Doctor Örley, of the Buda-Pest Museum, who reported that all the parasites that were sent to him were in the cystic stage of unknown species of tape-worms. The history, however, of *Anthocephalus hippoglossi* and *A. elongatus* (found in Madras horse-mackerel—*Caranx*—and cat-fishes) has been traced by no less an authority than Von Siebold, who has shown [8] that they are the cystic stages of *Tetrarhynchus corollatus*. Now this cestode, when adult, lives only in the digestive tracts of rays

---

Ann. Mag. Nat. Hist., 1884, Vol. XIII, 173.
[8] Zeitschr. f. Wiss. Zool, II, 241,

and dog-fishes; and, as we know, therefore, its two hosts, we may feel confident that man may eat fishes such as *Caranx* or *Arius* without any danger of being infested with *Anthocephalus*. "Definite knowledge," Bell concludes, "of the parasites of fishes, though by no means the first, is a most important factor in the solution of those problems which are of interest and importance not only to the zoologist, but to those that catch and sell, and those that buy and live on fish."

Masulipatam sub-division, 1892–93.—Decrease due to (*a*) employment of fishermen in cultivation on the early setting in of the rains; (*b*) floods in the Kistna river, and consequent inaccessibility from the mainland of the yards situated at the mouth of the river; (*c*) cholera.

Calicut sub-division, 1893–94.—Decrease in Malabar attributed to (1) some of the Cannanore fishermen, owing to a misunderstanding with the curers, taking their fish to the yards in S. Canara; (2) to a peculiar current running along the shores of Cannanore and Tellicherry, which was very unfavourable to the approach of cat-fish; (3) to a new kind of net introduced at Tellicherry, which proved a failure.

Chicacole sub-division, 1893–94.—The curers were extremely apathetic, owing to the large demand for fresh fish in the neighbourhood. A large decrease due to (1) the season being very unfavourable for fishing; (2) the emigration of some of the fishermen to Rangoon with a view to obtaining more lucrative means of livelihood; (3) some of the fishermen finding better employment on the east coast railway works. Decrease in 1896–97 on the west coast owing partly to increased demand for fresh fish, consequent on the population of the coast having been augmented by immigration from Bombay on account of the plague. Such demand necessarily means diminution of supply for curing.

1895. The Board of Revenue believes that the fishing classes all along the coast of the Presidency are much given to temporary migrations in search of lucrative employment, partly because they have less objection to travelling by sea than others, and partly because their calling as boatmen renders them handy and useful, and makes it easy for them to get good wages at the larger ports. Since 1888, from which time the Sheppard line of steamers has afforded additional facilities, and a cheap means of communication with several of the South Canara ports, young men are said to have been resorting to temporary employment in increasing numbers. The Board concurs with the Collector in considering that it

is not on account of the suppression of the use of salt earth that these migrations take place, but owing to the inducements in the way of good wages offered in Bombay.

With these prefatory remarks, I pass on to the diary of a tour of inspection of the fish-curing yards of Malabar and South Canara, undertaken in October–December, 1899. To Mr. C. M. Sherman, Assistant Commissioner, Salt and Abkári [9] Department, who accompanied me, I gratefully tender my thanks for the manner in which he carried out the thoughtful direction of the Commissioner, the Hon: Mr. J. Thomson, that full facilities and assistance be afforded to me in inspection and investigation; that all information available be afforded, and enquiries made according to direction; and that the inconveniences of travelling be mitigated as far as possible.

To one travelling westward on the Madras Railway, the first indication, and a potent one, of arrival near the seat of the fish-curing industry is a series of malodorous whiffs emanating from the fish baskets piled up on the platform of the Tirúr Railway station. From which place a run of five miles brings one to Tanúr, where the work of inspection commenced, on October 27th, with an initial blunder; the Salt Inspector, clad in blue cloth coat and trousers, on the former of which I failed to notice the Government crown, being mistaken for the station master. A procession was formed through the long, narrow main street, consisting of the Assistant Commissioner on a bicycle, myself in a manjil or muncheel (hammock-litter), carried on the shoulders of strong palm-hatted coolies, and youthful members of the village community running behind, and keeping up a running commentary in Malayalam on the gentleman on wheels. The travellers' bungalow, which was our goal, is situated outside the town on the sandy shore, in close proximity to the fishermen's quarters and curing yard, between which a stream of swarthy coolies in single file, like processional black ants, carried bundles of salt on their heads.

---

[9] "Áb-kárí, the business of selling a distilling strong waters, and hence elliptically the excise upon such business. This last is the sense in which it is used by Anglo-Indians. In every district of India, the privilege of selling spirits is farmed to contractors, who manage the sale through retail shop-keepers. This is what is called the 'abkary system.' The system has often been attacked as promoting tippling, and there are strong opinions on both sides."—*Hobson-Jobson.*

Fishing operations were temporarily suspended owing to a heavy sea, with a post-cyclonic swell, which, the Hindus prognosticated, would continue until after the dévali, or feast of lights, on November 2nd. The state of the sea rendered it impossible for the boats to get through the heavy line of breakers. The boats are made of aini (wild jack—*Artocarpus hirsuta*) or mango (*Mangifera indica*) timber, and carry a mat sail. A good boat, I was told, costs from Rs. 200 to Rs. 400 according to its size, and, barring accidents, will last from twenty to thirty years. To protect the boats against the ravages of boring poochees (insects, crustaceans, and molluscs), sardine-oil is rubbed into the timber both inside and out. This oil costs from Rs. 1–8 to Rs. 6 per kerosine tin (a new measure resulting from civilisation), according to the abundance or scarcity of oil in the market. As an example of molluscan want of respect for hard timber, I have exhibited in the museum a specimen of the extremely hard *Mesua ferrea* timber from the Calicut pier, which is riddled through and through by the boring *Pholas.*

A boat's crew is composed of five men, of whom four row, when the breeze is contrary, and one steers with a wooden paddle. The boats go out from eight to ten miles, where the depth is said to be ten fathoms; a fathom being graphically represented by the span of the outstretched upper extremities (*grande envergure*). It is worthy of note that, in British seas, trawl-fishing is carried on at a distance of 80 to 100 miles from the nearest port, whereas, in the Madras Presidency, the 'deep-sea' boats only go out from 8 to 12 miles from the coast. Short, however, as is this distance, speed in reaching the shore after a catch is an advantage. For the boats (in which no provision is made for protection of the fish from the sun) are not allowed by the regulations to take salt to the fishing-grounds, from fear of smuggling. And, as is well known, decomposition sets in, in tropical climates, with terrible rapidity. He who is not possessed of strong digestive organs should steer clear of fish-curing yards and fish markets in the East.

The various kinds of net used by the Tanúr fishermen are as follows; those with coarse meshes being made of hemp, those with fine meshes of cotton:—

(*a*) Shark net (valia sravuvala). Eight long sections connected together. Mesh 6½″. Two wooden floats attached to each section. Heavy enough to remain vertical in the water without weights. Value Rs. 50.

(*b*) Net for mackerel, small cat-fishes, Trichiurus, etc. (cheralavala or ailavala). A cone with truncated apex. Bag at lower end about 12′ long. Bamboo floats to keep bag open. Mesh 1½″. Attached to upper end, a net (katungani) with 7″ mesh, weighted with laterite bricks, and connected to two boats by rope at each end. Value Rs. 60.

(*c*) Net as preceding for sardines, soles, and sundry small fishes, with ⅜″ mesh. Value Rs. 100 owing to fineness of mesh.

(*d*) Net for seir, pomfret, big cat-fishes, etc. (vakkuvala), made in eight sections. Mesh 3″. Wooden floats at frequent intervals. Stones attached to lower end. Value Rs. 40.

(*e*) Net for small seir and other fishes (kandádi or nuppari). Very similar to preceding, but with smaller mesh. Value Rs. 40.

The fishermen of Tanúr are, for the most part, Mukkuvan converts to Muhammadanism, or new Islámites, and will not go out fishing on Fridays. "The Mukkuvans," writes the Census Commissioner, 1891, "are the sea-fishermen of the Malabar Coast, as the Mukayans are the fishers in the rivers. The names seem to be etymologically the same, and both are, I think, connected with Canarese Mogér, all the words coming from a root meaning 'to dive.' A Mukayan is, however, socially superior to a Mukkuvan, and their customs differ. A Mukayan will not take water from a Tiyyan, but a Mukkuvan may. According to a tradition, Mukayans, Mukkuvans, and Tiyyans are immigrants from Ceylon." A few individuals at Tanúr combine, like the modern actor-manager, the functions of fishermen with those of curer. But, as a rule, the fishermen dispose of their fish to the merchant curers on fixed terms to fixed customers, to whom they look for support in the slack season—the rainy and stormy S.W. monsoon. The fishing community were sleek and well-nourished, and, to judge from the swarm of children who followed me during my inspection of the yard, are eminently fertile. One fisherman indeed, was polygynous to the extent of seven wives, each of whom had presented him with seven sons, not to mention a large consignment of daughters. On the east coast the prevalence of twins is attributed by the fishermen to the stimulating qualities of fish diet. The crowd, which accompanied me everywhere, was kept back by a peon by means of harmless demonstrations with the tail of a skate. The happy possessor of the tail of the skate *Trygon uarnak*, with its spine intact, is believed to be safe from the influence

of spells and charms, and able to face the evil eye with impunity. On the occasion of a visit to Cochin, the travellers' bungalow, a noted resort of thieves, whereat I stayed, was guarded at night by a constable armed with the rostrum (saw) of a young saw-fish (*Pristis*), with the base cut away so as to form a handle.

Fishing operations being slack, the opportunity was taken to make myself, at the outset, familiar with the machinery by which the discipline and management of a fish-curing yard are kept under control.

The rule for attendance at the yard is that "the Assistant Commissioners must be guided by their own discretion in prescribing the hours, during which yards are to be kept open. The only instructions on the subject, which the Board considers necessary to issue, are that all possible facilities should be afforded to persons who desire to resort to them." Yard officers must live within half a mile of the yard, or in the yard itself. They should be present when the night fishing boats return (*i.e.*, about 9 or 10 a.m.). They are on no account to be absent on other duty. The hours of attendance are fixed at from 7 to 11 a.m. and 2 to 6 p.m., but are modified to suit existing conditions, *e.g.*, of pressure or slackness in the yard.

The routine forms prescribed in connection with curing operations, are as follows :—

(1) Register of fish-curers.
(2) Tickets of admission to the yard.
(3) Daily register of operations.
(4) Daily register of cured fish removed.
(5) Stock and cash register.
(6) Daily report.
(7) Weekly report of fish-curing operations.
(8) Weekly register of operations in the yard.
(9) Monthly abstract of curing operations from circles.
(10) Monthly abstract of curing operations from subdivisions.
(11) Annual statement of curing operations.
(12) Statement showing the expenditure on repairs to buildings in the yard.

Permission to resort to the yard is conditional on good behaviour and the observance of departmental rules; and tickets are liable to cancellation or suspension at the discretion of the Inspector or other superior officer, in cases of misconduct. Ticket-holders, failing to resort to the yard for

a consecutive period of six months, are, unless they account to the satisfaction of the Inspector for such failure, liable to cancellation of their tickets. In the case of the death of a ticket-holder, the *primâ facie* heir of the ticket-holder will be permitted, under the original ticket, to carry on operations at the yard. As examples of punishments enforced in connection with the maintenance of the discipline and sanitary condition of a yard, the following cases may be cited:—

Suspension for one year for removal of cured sharks from the yard without the knowledge of the yard officer.

Suspension for one month for removing dry fish without its being entered in the account.

Suspension for one month for insolent behaviour to the yard-officer.

Suspension for fifteen days for keeping old brine in the shed, and keeping the shed in a dirty condition.

Suspension until further orders for not resorting to the yard.

The mild grievances of the Tanúr fishing community, submitted to me as to one in authority, were :—

(1) That the fishermen-curers are taxed Rs. 18 as fishermen, and their wives Rs. 10 as curers.

(2) That each curer has to pay Rs. 2 rent for each shed to the land-owner. (They formerly paid Rs. 5). And they want Government to acquire the yard, and become proprietors thereof. The yards in the Calicut sub-division are situated either on Government land, acquired land, or private land (*i.e.*, land not on Government waste-land leased out).

(3) That the price of salt, which was originally 12 annas per maund, has, since 1892, been 1 rupee per maund.

(4) That the drying ground is not large enough. (If it were enlarged, it would be necessary to buy up houses on one side; and, on the other side, there is a Moplah Muhammadan burial-ground.)

(5) That they are not allowed to use old brine for curing small fish, after it has been used for big fish. (The objection to such a course is that the brine, after being once used, is impure, and has an evil odour.)

The Tanúr yard is surrounded by an aloe (*Agave*) fence, which has been planted as an efficient substitute for the former bamboo fence in keeping out intruders and marauders, human, domestic, and feral. Stored in the salt shed, at

the time of my visit, were 695 bags of salt, each bag containing two maunds. The salt is sent from the salt factory at Tuticorin in bags sealed with a Government leaden seal. If the supply of salt threatens to run short owing to exceptionally large catches, it can be speedily renewed from the salt depôt at Beypore, the former terminus of the Madras Railway. In the Tanúr yard are 89 curing-sheds, constructed mainly of bamboo, arranged in a row all round a large open space, constituting the drying-ground, whereof the cleanness was beyond criticism. Within the sheds were an enormous number of prawns (*Penæus sculptilis*, Heller), stacked in piles after being sun-dried without salting. Some of the prawns, which are caught close in shore, where the water is rich in fish-guts, are salted for export to Madras, Bangalore, etc., after removal of the legs, skin, and appendages. The common edible species of prawn in Madras, Mr. J. R. Henderson informs me, are *Penæus monodon*, Fabr., and *P. indicus*, M. Edw., but several others occur, including *P. sculptilis*, which is not rare.

The prevailing fish in the yard was mackerel (*Scomber microlepidotus*), known locally as aila. After gutting, which is carried out by expert hands at the rate of about 2,000 fish per hour, the guts are thrown into the sea, or on to the waste-land near the yard, and the fish are salted in boats called pathai, or in disused dug-outs. Therein the fish are arranged in layers, each sprinkled with salt. As the curing process advances, the fish become steeped in a briny juice, which is eventually thrown into the sea, and the boat cleaned. For export, the mackerel are neatly packed in baskets, each of which contains a thousand fish. At the time of my visit, a number of baskets were ready for export by rail to Trichinopoly.

The coast-trade in exported fish is amply provided for by the service of coasting steamers, which constantly ply from port to port, and serve as an easy medium of communication with Colombo, the Clapham junction of the east. But increased railway communication, with favourable rates for the carriage of fish, and refrigerating vans, would do much to advance the up-country distribution of fish, both prime and offal. From returns supplied to me by the courtesy of the Traffic Manager of the Madras Railway, I find that the weight of salt fish consigned from the principal stations in Malabar during the years 1891 to 1898 were as follows:—

FISHING VILLAGE, CANNANORE.

Year.	Tírur.	Tanúr.	Parpangadi.	Calicut.	Total.
	MDS.	MDS.	MDS.	MDS.	MDS.
1891 ...	64,040	53,045	30,631	15,348	163,064
1892 ...	44,561	39,849	31,938	15,152	131,500
1893 ...	44,484	31,974	27,446	16,820	120,724
1894 ...	43,200	28,799	31,259	14.423	117,681
1895 ...	45,825	27,203	23,653	9,211	105,892
1896 ...	47,980	34,605	32,045	11,338	125,968
1897 ...	45,255	44,104	32,909	10,501	132,769
1898 ...	50,375	30,127	24,626	3,396	108,524

The bulk of the traffic takes place between September and March, and coincides with the time at which fishing is most actively carried on. The general rate for salt fish, at owner's risk, on most railways, is a third of a pie per maund per mile. The Madras Railway rate is ·296 of a pie, or ·037 of a pie lower.

Drying in the Tanúr yard were considerable numbers of 'soles' (*Cynoglossus*, sp.), known all along the coast as mánthal, owing to their resemblance in shape to the young leaves of the mango tree. Big hauls of these flat-fishes are generally secured at the end of July and in August, but the present season was abnormal owing to the aberrant nature of the south-west monsoon. As will be seen from the following table of the rainfall at Calicut, the heavy rain out of season in April was followed by a great failure during the south-west monsoon :—

1899.	Total rainfall for the month.	Average rainfall for the month.
	INCHES.	INCHES.
April ..	20·34	2·86
May ..	4·64	10·34
June ..	42·33	36·28
July ..	13·04	28·39
August ..	4·35	14·90
September ..	3·03	9·01
October ..	10·05	9·93
November ..	0·11	4·21

The best hauls of soles occurred in September, as indicated by the following statistics :—

September	7	342	Maunds.
,,	10	762	,,
,,	11	1,600	,,
,,	12	491	,,
,,	13	180	,,
,,	14	424	,,
,,	19	264	,,
,,	20	1,227	,,
,,	21	851	,,
,,	23	6	,,
,,	25	139	,,
,,	27	87	,,
,,	28	711	,,

Afterwards only a few maunds or seers were caught in a day. The soles, after being incised with transverse cuts into the flesh at frequent intervals, are salted and dried, for sale especially in the Eastern taluks (sub-divisions) of Malabar, *i.e.*, Palghát, Ernád and Walavanád.

Drying, too, in the Tanúr yard, were a few nalla mathi (good fish), by which name is known the migratory 'sardine'[10] *Clupea longiceps*, of which a casual shoal had appeared some days previously, with the following results :—

October 19th—Small catch ; about a sixth of a boat-full.
,, 20th—Friday. No fishing.
,, 21st—238 maunds brought to the yard, and a large number sold fresh at Re. 1 per maund. The yard statistics are, it may be noted, not an index of the total catch of fish, as only those for which salt is required are brought to the yard.
,, 22nd—No shoal.
,, 23rd—219 maunds brought to the yard.

The shoals came, I was told, in a direction from north to south, and the fish were caught within a mile of the shore. They were about four inches in length, and not very oily. They are said to be full-grown, and to contain oil in abundance, in December. When big shoals appear (as they last did in 1895–96), they are pursued by predacious sharks, cat-fishes, kora (*Sciæna*), etc., and a rich harvest of fish, both great and small, is gathered in. It is hard to over-estimate the

[10] On the west coast *Clupea longiceps, Clupea fimbriata, Clupea lile* and *Dussumieria acuta,* said to have been preserved *á l'huile,* are known as sardines.

importance of the sardine, not only to the fishing community, but also to the planters, whose agents buy up the fish, and have them sun-dried on shore for the purposes of manure. And I quote, therefore, in detail the statistics of the sardine fishery throughout South Canara and Malabar, from north to south, during the three years, 1896–98.

Yard.	1896.	1897.	1898.
	MDS.	MDS.	MDS.
Hankarkotta	51	361	...
Malpe	111	167	...
Bokkapatna	4,249	4,054	43
Ullal	6,012	4,543	159
Manjeshwar	364	102	1
Kumbla	108	26	...
Kasergode	113	...	...
Bekal	1,137	1	...
Hosdrug	180	140	12
Mangalore	2,612	1,408	8
Taikadpara	226	77	...
Madai	9,003	3,628	658
Azikhal	8,419	1,033	167
Baliapatam	4,233	5,596	462
Cannanore	13,905	11,725	1,196
Tellicherry	22,390	22,305	1,578
Kurichi	2,804	5,095	99
Madakarai	2,851	2,168	18
Badagara	2,217	2,802	184
Quilandi	13,591	7,771	3,328
Elathur	8,281	4,092	535
Pudiappu	13,268	5,830	780
Calicut, North	12,093	7,644	245
Calicut, South	6,538	2,112	180
Beypore, North	5,825	858	326
Beypore, South	6,467	4,882	459
Parpangadi	24,985	19,664	3,243
Tanúr	78,566	55,096	7,894
Paravannah	7,601	5,780	511
Kuttai	17,040	5,935	873
Ponnani	20,681	12,269	132
Puthu Ponnani	11,466	5,483	255
Veliyangode	6,439	3,397	268
Palapatti	8,239	4,266	388
Edakazhiyur	11,924	6,697	220
Chowghat	14,562	7,883	571
Blangad	7,368	5,762	188
Vadanapalli	15,180	8,298	666
Mannalankannu	6,782	3,398	244
Kurikuzhi	9,328	9,018	2,498
Bemballur	86	2,283	313
Total ...	387,295	253,649	28,702

Accepting the figures as an approximation, and leaving seers out of account, we gather from the above table the following significant information, that, whereas in 1896 the total catches of sardines were 387,300 maunds, they had shrunk to 253,600 maunds in 1897, and dwindled away to 31,000 maunds in 1898. It is worthy of note that, of the 387,300 maunds recorded for 1896, no less than 103,550 maunds were caught at the Tanúr yard and its near neighbour Parpangadi.

For the accompanying statistics (Table III) relating to the sardine fishery, which show clearly the economic importance thereof, I am indebted to Mr. Morrison, Calicut Agent for Messrs. Arbuthnot & Co., who there possess a manure factory. Mr. McFarlan, Agent for Messrs. Arbuthnot & Co., has also kindly sent me the following statement of despatches of whole sun-dried sardines sent by coast agents from Mangalore to the coffee plantations:—

Year.	Tons.	Year.	Tons.
1890	119	1895	515
1891	87	1896	425
1892	125	1897	169
1893	427	1898	2
1894	424		

TABLE III.

Sardine Statistics.

Sun-dried Fish.			Fresh Fish.		
Season.	Tons.	Average price per ton.	Season.	Tons.	Average price per ton.
		RS.			RS.
1890-91 ...	34	25	1890-91 ...	165	7
1891-92 ...	84	25	1891-92 ...	75	7
1892-93 ...	145	25--30	1892-93 ...	158	7
1893-94 ...	1,443	25--30	1893-94 ...	198	6--8
1894-95 ...	1,764	25—30	1894-95 ...	42	12
1895-96 ...	1,625	25--30	1895-96 ...	166	7
1896-99 ...	*Nil*	...	1896-97 ...	18	12—14
...	...	...	1897-98 ...	24	12--14

In his report on the fish-census of the Ponnani Circle, taken during the first seven days of December, 1899, Mr. R. M. Brookes, Inspector, Salt Department, writes to the effect that "the week was rather unfavourable for fishing, owing to the easterly winds along the Palghát gap, which prevented the fishing classes from going out to sea for catching the larger classes of fish. Sardines, which are the fish most appreciated by the fish-eating classes in these parts, and which had altogether disappeared from the coast for the last few years, were caught here and there, and, at some stations, in pretty large quantities. In former years, this time of year was just the season for sardines as well as mackerel; and, judging from the fact that they were not caught in any two adjacent stations alike on the same day, I am in a position to say that the migration has not been complete." The catches of sardines, from north to south, during the census week are recorded in the subjoined table. At Tanúr, where the largest hauls were secured, the number of boats engaged in the fishery ranged between 196 and 117, with a daily average of 145. In addition to the sardines, the following big fishes are entered in the returns of the Tanúr yard during the census week:—

	No.
Mackerel	1,733,796
Kora	28,300
Sharks	988
Cat-fish	478
Skates	351
Seir	111

Number of Sardines caught in the Ponnáni Circle, December 1st to 7th, 1899.

—	First.	Second.	Third.	Fourth.	Fifth.	Sixth.	Seventh.
Beypore	...	5,000	...	...	...	20,000	15,000
Katalundi	...	8,530	28,000	...	...	28,000	25,000
Parpangadi	...	3,700	296,000	16,000	56,000	54,000	30,500
Tanúr	...	6,100	623,618	68,310	1,117,650	118,500	...
Paravannah	26,708	131,210	6,250	54,650	...	18,496	12,760
Kuttai	...	85,000	...	...	8,000	...	...
Ponnani	...	12,800	16,000	31,500	9,000	...	2,099
Putu-Ponnani	...	...	108,257	2,350	175	650	750
Veliankode	...	...	195,826	7,026	...	...	...
Palapatty	...	...	...	...	...	...	...
Manlakannu	651,036	49,550	...	48,000	...	...	...
Edakkaziyur	...	6,420	...	3,800	...	...	...
Blangad	...	1,500	...	1,050	...	...	...
Chavakkat	...	...	...	...	...	...	..
Vadanapally	...	...	...	...	...	...	...
Kurikkuzhi	...	...	...	...	...	2,500	...
Bamballur	...	...	...	...	...	...	...
Cochin	...	...	...	...	5,000	...	5,000

Hundreds of tons of fish-oil are said to have been annually exported from Cochin in former years. And I find that the average export thereof in the five years 1856 to 1861 was 19,630 cwt. The oil trade is, however, reported to be decreasing year by year. In some seasons the sardines arrive off the coast in enormous numbers, or, for several years consecutively, they may be present only in quantities sufficient for purposes of food. The result of this irregularity is that one very important element of success in commercial undertakings—regular supply—is wanting. In some years large shoals of sardines appear, and suddenly disappear. Contracts for the supply of oil are made on the arrival of the fishes, and, in the event of their disappearance, the contractor loses heavily. The natives of Cochin say that formerly the sardines always arrived regularly, and remained throughout the season. And the fishermen's belief is that they are at the present day frightened away by the numerous steamers which call at Cochin, and retire in search of a less disturbed spot. In addition to steam-boat traffic, noises in boats (*vide* tattu vala, p. 133), ringing church bells, artillery practice, the erection of lighthouses, gutting fish at sea, using fish as manure, burning kelp, and the wickedness of the people, have been charged with being responsible for a falling off of the fish supply. But, as Mr. Fryer naively remarks,[11] "of these alleged causes, only the last, it is to be feared, has been, and is likely to be, a permanent factor in the case."

The preparation of the evil-smelling fish-oil is carried out in large iron cauldrons, in which the fish are boiled with a little water. The oil, as it exudes, rises to the surface, is strained through cloth, and stored in barrels. The residue in the cauldrons is preserved, and utilised as manure for coconut gardens, paddy (rice) fields, etc. A rougher, and cheaper process of oil extraction, by which the cost of cauldrons and firewood was saved, has practically been put a stop to as being an offensive trade. This process consisted simply in putting the fishes into a canoe, and exposing them to the influence of the sun until decomposition set in. The oil then rose to the surface, and was removed with a scoop. By this crude process a comparatively small quantity of the oil was extracted. A portion of the manufactured oil is consumed locally by boat-owners for smearing their boats, so as to preserve the wood and coir rope (made from the fibre of the

[11] Fisheries Exhibition, London, 1883, Prize Essay.

coconut husk), with which the timbers are stitched together. But the bulk is exported to Europe and some Indian ports. The natives believe that the oil returns from Europe, masquerading in the guise of cod-liver oil.

October 28th.—By train to Calicut, the capital town of Malabar (or Ma'bar, to give it its mediæval name), whence are exported coir yarn, coconuts, pepper, nux vomica seeds, ginger, coffee, chillies, Indian 'rose wood' (*Dalbergia latifolia*), fish, etc. For breakfast at the hotel oysters from the Ellatúr river, prawns, whiting, soles and salted roe. Mackerel, though good eating when quite fresh, soon taints, and does not find favour with the European community. Pickled with vinegar, it is, however, quite excellent.

On October 30th the unfavourable conditions for fishing had ceased, and it was possible to go out with the hand-dredge without fear of being drowned, swamped, or drenched. At high-tide mark, where I had drawn a blank on the two previous days, I found a very large number of shells of the edible, and pearl-bearing *Mytilus viridis*, cast on shore from some neighbouring bank, over a limited area of a quarter of a mile, extending from the French flag-staff to the Malabar club.[12] Marine algæ (sea-weeds), which form so conspicuous a feature of the British coast after a heavy gale, were marked by their absence. Far more interesting were my walks on the Calicut beach in 1894, whereon the following notes were made at the time. "Conspicuous by their abundance were the *Siphonophora Velella* and *Porpita* (Portuguese-man-of-war); the shells of the mollusc *Mytilus viridis*; the young of the cirrhiped *Balanus tintinnabulum;* the carapaces of the Crustacean *Matuta miersii;* and the burrowing Crustacean *Hippa asiatica*, swarms of which are destroyed by fishermen with each cast of their nets, and heaped up on shore. *Hippa*, which lies buried between tide-marks on the Calicut beach, is collected by digging with the hands, roasted with medicinal herbs, and applied as a fomentation to sore legs. Prevalent on the beach were sharks' vertebræ, teeth, and horny purses

---

[12] The French have a *loge* in Calicut 'occupée par un gardien.' The loge consists of six acres on the sea-shore about half a mile north of the Calicut light-house, and adjoins the old district jail site. The exact facts connected with the foundation of the French factory are involved in doubt. Beyond the fact that the landed property and houses are untaxed, there is nothing to distinguish the loge from the rest of Calicut. It is doubtful what rights the French Government has in it."—Logan, *Manual of Malabar.*

(egg-cases) attached to drift coir fibre; worn madreporarian coral fragments, doubtless carried by currents from the distant Laccadive Islands; and a pennatulid (*Cavernularia malabarica* sp.n. Fowler). This pennatulid was being cast ashore in large numbers at the time of a visit to Calicut during the south-west monsoon, 1893, with the object of ascertaining whether Calicut could serve as a source of supply of cowry shells (*Cypræa moneta*) for the Belgian Congo State.[13] In India until late in the present century, about 5,120 cowries went to the rupee.

Mr. Sherman tells me that, during his inspection of the fish yards between Ponnáni and Beypore in August and September, 1899, some of the species of fish, which travel up the rivers, were lying dead along the shore at Ellatur, north of Calicut. These included the nair fish (*Lates calcarifer*), kora (*Sciœna*, sp.), and the bá-mín (*Polynemus tetradactylus*), which gives sport to the trolling angler. Mr. Marsh, Assistant Engineer of the new Calicut-Cannanore Railway Extension) informed Mr. Sherman that hundreds of dead fish had been seen daily passing out with the tide. The theory of the fishermen was that the mortality was caused by the poisonous water lying stagnant in the rivers and backwaters owing to the failure of the monsoon rain. The chief time for coir manufacture, by steeping the coconuts in water, is in August and September. And it is possible, as Mr. Sherman suggests, that, owing to the failure of the normal floods and freshes, the upper reaches became contaminated, with the result that the fishes which came up with the tide were poisoned before their return to the sea.

In connection with fish mortality, Sub-Lieutenant E. J. Headlam, of the Marine Survey Steamer 'Investigator,' has been good enough to supply me with the following note concerning a curious mortality among fishes, which was noticed, from December 19th to 23rd, 1899, off the South Canara coast over an area of several square miles to the northward of Kundapúr. "The fish" he writes, "which were seen dead in thousands, were of all descriptions and sizes, from those only a few inches long to some of four or five feet. From the appearance of many, it was evident that the mortality was amongst both the surface fish and those which live only at the bottom, as several were of the kind and appearance of those brought up in the net when dredging.

---

[13] The supply was eventually arranged for by a Bombay firm.

The stomachs of all were more or less distended, and the smell was very powerful and nauseating, having a decidedly sulphurous odour. The area affected extended from immediately north of the rocky reef which runs out from the north of Kundapúr in lat. 13·38½ north and long. 74·40 east approximately, along the coast as far north as the village of Kirmunjeshwar in lat. 13·46 north and long. 74·37½ east approximately; and extended about four miles out to sea, covering roughly an area of 32 square miles. The water ran out regularly as to depth from the shore to nine fathoms, the bottom being chiefly soft mud. In the southern half of the area are several large rocks. The fish were first noticed on December 19th, and on the 21st there was, over the affected area, hardly a square yard without at least one dead fish floating in it. And the whole of the beach was strewed with the dead bodies. On the 22nd considerably less were noticed, and by the 24th they had all disappeared." A possible solution of the cause of death is to be found in an incident, which was observed by Mr. Crawford, a commercial agent at Alleppy. "A number of years ago," he writes,[14] "I brought to the notice of General Cullen that the perfect smoothness of the water in the roads and at the beach at Alleppy, was attributable, not to the softness of the mud at the bottom, so much as to the existence of a subterranean passage or stream, or a succession of them, which, communicating with some of the rivers inland and backwaters, become more active after heavy rains, particularly at the commencement of the monsoon, than in the dry season, in carrying off the accumulated water, and with it vast quantities of soft mud. . . . . Due west of the flagstaff, and for several miles south, but not north of that, the beach will, after or during the rains, suddenly subside, leaving a long tract of fissure varying from 40 to 100 or 120 yards in length. The subsidence is not so quick at first, but, when the cone of mud once gets above the water, the fall is as much as 5 feet in some instances, when the cone bursts, throwing up immense quantities of soft soapy mud, and blue mud of considerable consistence, in the form of boulders, with fresh water, débris of vegetable matter, decayed, or, in some instances, green and fresh. These bubbles are not confined to the seaboard, but are, I am inclined to think, both more active and numerous

---

[14] Rec. Geol. Surv. Ind., Vol. XVII, 1884, p. 18—*vide* also Lake Rec. Geol. Surv. Vol. XXIII, 1890, p. 41.

FISHING BOAT, MANGALORE.

in the bed of the roads with the flagstaff bearing from east-north-east to the south, until it bears north-east by north or even south of that. About 5 years ago, for about four miles down the coast, and from the beach out to sea for a mile and a half, the sea was nothing but liquid mud. The fish died, and, as these cones raised their heads above the surrounding mud, they would occasionally turn over a dead porpoise, and numerous other fish. [15] The boatmen had considerable difficulty in urging their canoes through this, to get outside of it. The beach and roads presented then a singular appearance—nothing to be seen but these miniature volcanoes, some silent, others active, perfect stillness of all around the ships in the roads, as if in some dock, with a heavy sea breaking at seven fathoms outside."

The District Medical Officer, Malabar, recently sent me specimens of *Saccobranchus fossilis* for identification. "This fish," he writes, "is supposed to be poisonous, as, when a person is bitten by one of them, gangrene gradually takes place; and, if the part is not removed above the nearest joint, it slowly and steadily goes on spreading upwards. During the last three years, I have performed about eight amputations for the result of these bites; and, in one neglected case, I had to remove the arm above the elbow joint. The fish is supposed to be a fresh-water one, and, when caught by the fishermen, is avoided; and, rather than touch it, they chop it in bits." In his *Fishes of India* Day states that "wounds from the pectoral spine of this fish are dreaded in India, as they are reputed to be very poisonous, even occasioning tetanus. As soon as captured, the offensive spine is broken off by blows with a stake. Consequently it is difficult to procure a large and perfect specimen. Fishermen dread it so much, that they would prefer cutting the meshes of their nets, and allowing it to escape, than endeavour to remove it uninjured. As food, the flesh is esteemed for its invigorating qualities, and tanks are frequently stocked with them during the rainy season." It is called in Tamil théloo (scorpion), and in Malayalam kari meen (black fish).

October 30th.—By boat at night from Ellatúr to Badagara, the chief town of the Kurumbanád taluk, where, as the

---

[15] A letter was written some years ago to a local newspaper, complaining that I have a porpoise exhibited in the mammal gallery, instead of with the "other fishes." No defence is necessary, except for the benefit of those who are not aware that whales and porpoises belong to the Mammalia, and not to the Pisces.

newspaper hath it, I spent a day "dissecting and examining the vital organs of the catches brought ashore." A visit was paid to the weekly market, being held outside the travellers' bungalow, whereat were congregated the vendors of betel,[16] sarsaparilla, chillies, chunam, mats, and chatties (earthen pots) with thumb-nail and finger tip impressions as a primitive form of ornamentation. Also displayed for sale were coir yarn, cocoanuts for fuel, large-fruited plantains (nenthrai kaia), lotus flowers (*Nymphæa*), of which the stamens are used medicinally, various medicinal herbs, and vegetables. Conspicuous by their bright colour were the red flowers of *Ixora coccinea* (chekki pu), used for offering at shrines ; and, among other economic products, I noticed some leaves (etchil thali) used for rubbing over the cocoanut spathes to increase the yield of sap (toddy, when fermented), and for removing superfluous oil from the hair. The usual cheap looking glasses, and beads and tawdry jewelry made in Europe, which are fast replacing the indigenous peasant jewelry, were much in evidence. In the market swarmed the inhabitants, made up largely of Tiyans with heavy ornaments in the dilated ear-lobes, Cherumans, dark-skinned, and curly-haired, with a mass of brass ornaments round the neck and in the ears, and Moplahs (or Mappilas). The prevailing white cotton clothing of the native throng was a relief to one accustomed, in his every-day life, to see Tamil women clad in gaudy piece-goods, barbarous alike in colour and design.

At the time of my afternoon visit to the fish yard, the boats were out fishing not far from the shore, and the presence of a shoal was indicated by piscivorous gulls. On the beach a merry throng, equipped with baskets, awaited the return of the boats, and vendors of cakes and sweet-meats did a brisk ready-money business. Trotting along to the fish-yard were men in pairs, with a bamboo pole supported on the shoulders, and hanging therefrom, not a gigantic bundle of grapes, but seir and cat-fishes in rope crates or baskets. Seir are caught either with a net, or by means of a bar provided with 'tangles' and a row of hooks baited with mackerel or sardine heads. One man was noticed on the shore with sixty nalla mathi (*Clupea longiceps*)

---

[16] "The leaf of *Piper Betle*, chewed with the dried areca leaf (which is thence improperly called betel-nut, a mistake as old as Fryer, 1673), chunam, etc., by the natives of India."—*Hobson Jobson.*

on a string, which he had purchased for a third of an anna—the cheap price of an evening meal for a family of three, with which the Lipton restaurant could not compete. At Badagara the larger boats (which cost Rs. 500) are manned by eight men. For a pair of boats a complete battery of nets costs, I was told, Rs. 1,000. A boat is capable of holding about 25,000 sardines and 10,000 mackerel. Sardines realise from 1 to 10 annas per thousand, and mackerel from 8 annas to Rs. 1–4 per 1,000, according to the catch. Fish are conveyed from Badagara to the distant Wynád by runners, with changes at fixed stages *en route*.

On the method of fishing and nets used at Badagara, I may quote verbatim a note which was prepared for me "When shoals of sardines appear near the shore, cast-nets, with small mesh and sounding bells, are generally used. The boats employed are small ones, and the rowers are generally one or two in number, excluding the man who handles the net. The boat remains almost stationary when the net is spread. The man who works the net must stand, and should be very careful in maintaining his equilibrium during ebb and flow of the tide, which will frequently occur when the boats are within two miles of the shore. The cast-nets are made of very fine fibre, and present a circular surface, when they are horizontally spread. It acquires a conical shape by the weight of the leaden bells attached to the ends of the nets, and they are all brought to a point by means of a cord passing through the bells. It then presents a double cone, with the bases facing each other. The shoals caught find no egress.

"The nets most generally used are the odam nets. They are made of fine threads of cotton with $\frac{3}{8}''$ mesh. Two boats should be employed in using these nets, and the ends are attached to one side of each boat. To preserve the net from being torn by the weight of heavy shoals or by big fishes, coir ropes interwoven with big meshes are spread below the odam net. After the nets are attached to the ends of each boat, the boats separate themselves as long as the length of the net would allow, and they are rowed in the direction of the free ends of the boats. After some time, the two boats meet, and the contents of the net are emptied by raising the two ends of the nets. They are again lowered, and the same process is continued till the shoals disappear, or till the boats are filled. Only deep-sea boats are employed

in using these nets, and they are rowed with four or eight oars.

"There exists no arrangement, in the case of small fishes, between the person who first sees the shoal and others who take advantage of it. It is only in the case of big and valuable fishes that some rules prevail. The person who first sees the shoal makes a signal by raising his oar, and follows the shoal until boats arrive with nets. When they come in large numbers, they are not to spread their nets without his permission; and only the man, whom he selects, is allowed to spread the net. And he generally gets half, if he possesses such nets as are employed in catching that particular kind of fish; and a boat-ful of fishes in other cases, when the shoals are enormous. The persons who are not selected are at liberty to spread their nets far away from the chosen boats, and are not obliged to give up any share, if they are so fortunate as to obtain anything by a change of course of the shoals. There is a strong arrangement between the fishermen that they should not spread their nets without the permission of the signaller; and, if they cannot come to terms with him, they lose the opportunity."

Other nets used are—

(1) Kandati vala, for seir, kora, pomfret, small sharks, etc. Fibre, $2\frac{1}{4}''$ mesh.
(2) Odu vala, for big fishes. Fibre, 3″ mesh.
(3) Nariyam vala, for big fishes. Fibre, 4″ mesh.
(4) Shark and skate vala. Fibre, 7″ mesh.
(5) Mathi vala, for sardines. Cotton, 1″ mesh.
(6) Veechil vala, for smaller fishes, *e.g.*, sardines, mackerel, soles, mullan (Equula), etc. Fibre, $\frac{1}{2}''$ mesh.
(7) Veechil mathivala, for sardines. Cotton, 1″ mesh.
(8) Chala vala or thattu vala (tapping net). Cotton, 1″ mesh.
(9) Vaku vala, for cat-fish, kora, and other big fish. Fibre, $\frac{1}{2}''$ mesh.
(10) Kora vala, for kora. Fibre, $\frac{5}{8}''$ mesh.

At the entrance to the Badagara fish-yard we were received by a guardian peon, carrying a long wand of office. The yard, situated on the open sand, close to a big Muhammadan burial-ground with laterite tomb-stones, was deserted save for one man, who was busy salting split cat-fishes. From the uterus of a gravid female the developing embryoes were removed for my edification. The eggs of the cat-fish are boiled with salt, and eaten. Concerning the breeding

habits of the genus *Arius*, Day writes as follows:* "The breeding of these fishes is peculiar, and deserves attention. The eggs of *Arius* are large, averaging about 0·5 to 0·6 of an inch in diameter, and I have found many males of the genus with from 15 to 20 eggs in their mouths. Some of these eggs were in an early stage of development, others nearly ready to be hatched; while, in the mouth of one specimen, was a hatched fry having the yolk-bag still adherent. The eggs filled the cavity of the mouth, and extended far back to the branchiæ. Whether the male carries about these eggs in his mouth, or only removes them, when danger is imminent, from some spot where he is guarding them, is questionable; but, in none of the specimens which I examined, did I find a trace of food in the males which had been engaged in this interesting occupation." The double uterine cavities of a female *Arius*, examined by me, contained 56 and 75 ova respectively, with a diameter of about 1·3 cm.

The fishermen at Badagara are nearly all Mukkuvans. The ticket-holders in the yard, which is private property, are all (29) Moplahs. The Moplahs are, it may be noted, traders on the Malabar Coast, and cultivators in the interior; and, in both capacities, are industrious, successful, and prosperous. They all follow Muhammadanism, and their numerical strength is recruited from the lower classes of Hindus, who, by conversion, gain a distinct rise in the social scale.

A deputation of fishermen waited on me, whereof the principal spokesman was a youthful Mukkuvan, who had entered the lists of higher education. The main grievance, as expressed to me, was that the Mukkuvans are the hereditary fishermen, and formerly the Moplahs were only the purchasers of fish. A few years ago, the Moplahs started as fishermen on their own account, with small boats and thattu vala (tapping nets), in using which the nets, with strips of cocoanut leaves tied on to the ropes, are spread, and the sides of the boats beaten with sticks and staves, to drive the fish into the net. To quote a note submitted to me: "There is a net called chala vala or thattu vala, which is commonly used in catching ila. The special feature of this net is that the meshes are somewhat larger than those of the odam vala, so as to allow the first portion of the ila to pass through, but not the whole organ. When they find shoals of ila, the Mappilla fishermen surround the shoals with nets, and make

* Faun Brit. Ind. Fishes, 1889.

a great noise by beating the boats. And the fishes are frightened, and try to rush through the meshes of the nets, and then are caught, and incapable of retracing their steps. The noise made extends to a great distance, and consequently the other shoals go to the interior of the sea, and do not resort to the shore or near it. The use of this net not only prevents shoals of smaller fish from resorting to the shore, but also is a cause of the disappearance of the bigger and valuable varieties of fish, which chase and live upon the smaller ones. This net has been in use for the last five or six years, and there has been decrease in the catch each year. The fishermen request that Government should interfere in the use of these nets, and the method of catching."

The deputation ingenuously attributed the undoubted fact that catches of mackerel have been well maintained since the introduction of the thattu vala, while those of sardines have decreased, to the former being a bold fish, and not frightened by the tapping. If, they said, the thattu vala was prohibited, big, but nervous, fish, *e.g.*, cat-fish, kora, seir, etc., would come in after the mackerel, whereas at present they are frightened away, and remain in deep water. The day before they had detected a big shoal of cat-fish six miles out at sea, and quarrelled as to who first discovered it, and was entitled to the privileges due to him. While they were still quarrelling, the shoal went off, and was lost. A veteran fisherman put the real grievance of his brethren in a nut-shell. In old days, he stated, they used salt-earth for curing fishes. When the fish-curing yards were started, and Government salt was issued, the Mukkuvans thought that they were going to be heavily taxed by the Sircar (Government). They did not understand exactly what was going to happen, and were suspicious. The result was that they would have nothing to do with the curing yards. The use of salt-earth was stopped on the establishment of the issue of Government salt, and some of the fishermen were convicted for illegal use thereof. They thought that, if they held out, they would be allowed to use salt-earth as formerly. Meanwhile the Moplahs, being more wide-awake, than the Mukkuvans, took advantage of the opportunity (in 1884), and erected yards, whereof they are still in complete possession.

November 1*st*.—By express pony transit to Tellicherry, with a halt *en route* to inspect the small petty-officer's fish-yard at Madakarai. The ticket-holders, of whom six were Mukkuvans and nine Moplahs, were working side by side in apparent amity. A few decapitated sardines, and a fair

number of mackerel were being cured in tubs made of mango wood, or drying in the sun beneath nets, to keep off crows, kites, and other predaceous birds. Stacked in the sheds were some big sharks' fins, which are sold to Tellicherry merchants for export to Bombay, and sharks' flesh and cat-fish ready for shipment to Colombo. The brief inspection concluded, a visit was paid to a Malabar civet-cat (*Viverra civettina*), the property of a Moplah, kept in a cage for the sake of its dung, which is sold to native doctors at the rate of As. 3–4 per panam (= 4 annas weight). The dung of this animal is impregnated with the secretion of the anal glands. And in Southern India, Waring informs us "[17] the unctuous odorous secretion of this animal is much employed by the native practitioners under the name of kustúri. In Travancore there was, and probably is still, an establishment, kept up at the expense of Government, in which these animals were kept and reared for the sake of their secretion, which is used for perfumery as well as for medicinal purposes (stimulant and aphrodisiac)."

Between Madakarai and Tellicherry is the French Settlement of Mahé, picturesquely situated close to the river-mouth. The outward and visible signs of French occupation were the tricolour flag flying over the house of the Chef de Service, and notice-boards, *e.g.*, licence générale, école évangelique, services financiers, etc. Round Mahé are several customs chowkies, with a preventive establishment for guarding the frontier against the smuggling of dutiable goods, such as liquor, arms, ammunition, opium and salt.

At Tellicherry the club dinner-table was tastefully decorated with the counterfeit resemblance of pomfret in coloured rice-grains of many colours. As luxuries may be mentioned big 'soles,' sardines served, like cat's meat, on a stick, devilled oysters, and tamarind prawns eaten as a pickle with curry. The best tamarind fish is obtained from the seir and nair fish (*Lates calcarifer*). In the ordinary method of preparation, the fish is boiled, and, after removal of the bones, cut in thick slices, highly spiced, left to soak, and packed in a jar. But the following account of a new and improved process, now being carried out at Cochin, has been sent to me by Mr. Sherman. Fish of all sizes can be cured, but, for the Colombo market, mackerel are preferred. The fish are not slit open, but neatly gutted by extracting the entrails through the gill-opening. They are then carefully washed,

---

[17] *Pharmacopœia of India*, 1868.

and packed, with alternate layers of salt, in big casks, which are procured locally, and sold in Colombo with the fish. To each maund of fish about 7 lbs. of tamarind fruit (govaka-pully) are used. This is obtainable locally, but of poor quality, so the curer prefers purchasing in Colombo, where it costs him Rs. 4 per cwt. The casks are neatly made of the timber of the silk cotton-tree (*Bombax malabaricum*), and fitted with a bung and spigot. They are stored on end, and filled to the full. The fish is allowed to soak and pickle for four days, and the brine is then drawn off from the tap, which is about a foot from the bottom, and thus leaves just enough brine to keep the whole cask moist when closed. Under this new system 1,658 maunds 5 seers of mackerel with 375·7 maunds of salt are used, or 18·6 lbs. per maund against 12·5 lbs. used in the usual west coast method of curing. The curer informed Mr. Sherman that he had shipped 75 cases of fish to Colombo, where they realised, with the cask, Rs. 50 (each cask holds about 5,000 mackerel). The duty amounts to Rs. 6 per cask, and Rs. 2–12 are paid for freight to Colombo.

The Native and Eurasian youths of Tellicherry are, I was glad to see, keen cricketers. But, in the interests of the game, I enter a protest against a youthful batsman who was sharing a cigarette with point and the wicket-keeper, and handing his cheap smoke to the latter before starting for a run.

In the fishing village, situated at the extreme south of the town, as I passed through it on the way to the fish-yard, women and children were busy spinning cotton thread, and repairing nets. Great destruction of the nets is effected by sharks, which, when seizing their helpless prey caught in the toils of a net, devour not only the fish, but also the portion of the net wherein they are imprisoned. Only a few days previously, on the occasion of a big catch of seir, fifteen nets had been thus more or less badly damaged.

Outside the yard seer, cat-fishes, and other big fishes were being cut up with a hatchet prior to curing. The number of ticket-holders at the Tellicherry yard was 100, of whom 25 were Moplahs, 9 Mukkuvan males, and 66 Mukkuvan females, who attend to the curing while their husbands are away at the fishing ground. Disputes between the two communities are, I was told, rare. Each ticket-holder is responsible for the cleanly condition of the drying-ground in front of his shed. The yard is situated within municipal

limits, and the drying of sardines on the sea-shore for manure is forbidden on sanitary grounds. These fish, when in abundance, have therefore to be sold fresh for local consumption, or salted in the yard. For, by departmental rule, no fish is allowed to be dried in the yard, which has not previously been salted with salt purchased in the yard. The yard is at present washed, and the protecting fence damaged by the heavy seas of the south-west monsoon, which break in the yard; and the yard is, I understand, to be thrown back on the land side.

Drying in the yard, amid an expectant crowd of crows and pariah kites, seated on the fence ready to carry off an unguarded morsel, were chala mathi (*Clupea fimbriata*) from a recent shoal (noted as being 'fatty'), of which 82 maunds were brought to the yard, and young (quite recently born) sharks (*Carcharias*), as well as the back-bones, gills, heads, and flesh of larger sharks. The fins are sold for local consumption, or exported to China *viâ* Bombay. [18] Sharks' livers are sold in the market for food. Such fish as remain unsold in the fish-market at the end of the day are brought to the yard for curing. In process of drying was the product of recent good hauls of mánthal, caught in nets close in shore, or, more simply, with the prehensile toe. Drying, too, without previous salting, were the sounds or maws of kora and cat-fishes, which are shipped, for the preparation of isinglass, to China and Europe. The price thereof ranges from 2 to 6 pies when fresh, and from 3 pies upwards after drying, according to the state of the market. The various fishes curing in the sheds were soaking in tubs made of mango, ben-tek (*Lagerstrœmia lanceolata*), and deal-wood. Of which deal is said to last the longest time. A remote effect of the war in South Africa, felt at Tellicherry, was that one merchant had fish-sounds to the value of Rs. 8,000 awaiting shipment, as the coasting service was dislocated by the employment of the coasting steamers as transports.

The following table shows the total quantities of fish, and of mackerel and sardines, cured at Tellicherry during the five years 1894–1899 :—

---

[18] "I have to come down from the regions of high finance to grovel among fish-maws and shark fins; but these articles will bring me in sufficient revenue to pay for the salary of a High Court Judge for half a year."—Speech by the Finance Minister to the Imperial Legislative Council, March, 1894.

—	Total.	Sardines.	Mackerel.
	MDS.	MDS.	MDS.
1894–95	81,226	11,469	8,380
1895–96	85,314	22,330	17,950
1896–97	79,015	22,305	5,055
1897–98	68,551	1,578	23,794
1898–99	53,639	177	135

Big fish, with the exception of seir, had not been coming in, during the present year, in large quantities. It is difficult to give an exact statement of the price of fish, as this naturally depends on demand, size, etc. But the following are the approximate values of some of the more important fishes :—

(*a*) *Fresh.*

Shark ..	..	As. 2 to Rs. 20 each.
Skate ..	..	As. 2 to Rs. 2 ,,
Cat-fish..	..	Rs. 10 to Rs. 15 per 100.
Seer ..	..	Rs. 25 to Rs. 40 ,,
Kora ..	..	Rs. 40 to Rs. 120 ,,
Pala-meen	..	Rs. 40 per 100.
Mezhu-meen	..	Rs. 50 ,,

(*b*) *Salted.*

Shark ..	..	As. 3 to Rs. 25 each.
Skate ..	..	As. 3 to Rs. 3 ,,
Cat-fish	..	Rs. 12 to Rs. 17 per 100.
Seer ..	..	Rs. 27 to Rs. 42 ,,
Kora ..	..	Rs. 50 to Rs. 130 ,,
Pala-meen	..	Rs. 42 to Rs. 45 ,,
Mezhu-meen	..	Rs. 54 to Rs. 56 ,,
Pomfret	..	Rs. 7 to Rs. 8 ,,

A deputation of fishermen waited on me, headed by a Stalwart Mukkuvan, with the lobes of his ears distended with gold ornaments, and, as an understudy, a Moplah, who explained the mechanism of the nets in dumb show with the aid of his voluminous body-cloth. When interviewing natives, for anthropological or other purposes, through the medium of an interpreter, I am always glad to see them indulge in pantomime, as it is a guarantee that they are graphically describing what they have actually seen. And my memory recalls an occasion, on which a certain tribe were acting for my instruction the ceremonial observed at a funeral. The play broke down, as no one would undertake the leading rôle of corpse.

PL. XI.

FISH-YARD, MANGALORE.

The main grievance of the fishermen at Tellicherry, as at Badagara, was in connection with the much-abused thattu vala, introduced, as I was informed, from Chowghât and Ponnani, by the poorer classes of Moplahs and Mukkuvans, who cannot afford big nets. The offending net, it appears, is used by about 40 out of the 200 boats, which make up the Tellicherry fishing fleet. But I will let the fishermen ventilate their grievance in their own language, as set forth in a petition to the Collector (chief magistrate) of Malabar, which is an interesting thesis on the fish industry.

"From time immemorial our means of livelihood has been fishing. We follow the old and established method of fishing prescribed by our ancestors. In good old days we were having a pretty good draught of the several kinds of fishes, such as kora, etta (cat-fish), azakoora (seir), avoli (pomfret), chiravu (shark), etc., especially mackerel and sardine, colloquially known as kudumbam pularthi, or that which gives plenty and prosperity among the families. At the time of scarcity it is not always possible for the extremely poor people to buy and eat them. But, whenever there is a considerable quantity of fish, rich men among the fish-curers, who can afford to buy them, do so, and it is distributed among the poor classes for getting it cured, and for this they are 'enumerated' either in kind or in cash. The dry fish is afterwards sent to different places, such as Ceylon, Mysore, Coorg, Coimbatore, and Madras. In other words, besides the several advantages of a good business for the fishing class and the merchant dealing in fish, it does immense good to the poor people at large, and to the country. A regular and heavy haul of sardine and mackerel during the proper season is a source of pleasure and prosperity not only to the public who consume fish, but also to the well-to-do.

"To exemplify the above statement, we may quote a practical instance. When fish is dear, only two or three sardines can be had for one pie, and one mackerel for two pies. The fish, when it is taken to the market during the time of scarcity, is soon sold, and the poor who live at a distance from the market, and even those who happen to be near the market, are not in a position to buy them; whereas, when there is a considerable quantity of the kind of fish mentioned, they become dirt cheap in the market. So much so, that a basket full of sardines, numbering about 200, can be had for a single pie, and sometimes for nothing, and 25 mackerel for 2 pies. Consequently, a family requiring a daily expense of Rs. 1⅛ can pass the day rather comfortably,

when the fish is cheap, at the expense of 10 annas at the greatest. Hence it is that our forefathers gave the familiar name of kudumbam pularthi to the sardine and mackerel.

" Seeing that sardine is a very good manure for the coffee plantation, the European merchants of the place undertook to prepare a large quantity of the manure at the expense of thousands of rupees every year, thereby rendering immense good to the country, and especially to the poorer class who worked under them, and to the fishermen, who also got a tolerably fair price for their game. The contractors and bandy (cart) men, who undertook to transport the manure to the gardens, also own that it was a lucrative job.

" Now that there is a scarcity of fish, especially of sardine and mackerel, the public who consume fish are put to great hardship, and the poor fishermen, who are solely depending upon the seafaring life for their maintenance, are day by day pushed to the brink of dire poverty.

" Ever since the introduction of the fish-curing yard, the quantity of salted fish has fallen considerably low from diverse causes. The fall in the quantity of dry fish may be attributed—

(*a*) to the very high price of salt issued from the yard, compared with the extensive sea-beach, where the salt fishes were dried formerly ;

(*b*) to a stringent rule prohibiting the removal of salted fish beyond the precincts of the yard for getting it dried.

" In good old days, the nets mentioned below alone were made use of for fishing, and there was a regular supply of different kinds of fish during the proper season :—

1. Odam vala.
2. Ozhuku vala, odu vala, varean vala, or chara vala.
3. Veechu vala.
4. Kora vala.

The above contrivances were so much adapted for fishing that, during the operation of fishing with the nets, it created no noise or dread among the shoals of fish.

" Some five or six years ago, a new kind of net, known as ayla thattu vala, mathi thattu vala, and mathi chala vala, was introduced by a very few of the fishermen. At the commencement of the season, when the sardine and mackerel approach the shore, these new nets are made use of, with the result that the tremendous noise, which is the sequel of the innovation, is just sufficient to scatter the shoals of all the

kinds of fishes that are near the shore, and to scare them away to the depths, where we do not venture in our small boats.

"This mode of fishing with the thattu vala is briefly as follows: A small boat with three or four men, and a pretty long sheet of this net, consisting of some half-a-dozen small pieces joined together edgewise, would quite do. As soon as these boatmen come upon a shoal of mackerel or sardine, they put the net (having weights and floats on either side) all round the shoal like a fence. Soon after this the boatmen set up a tremendous noise by beating the sides of the boats with oars, rudder, and sticks especially adapted for it, and by throwing the plumbs violently in the centre of the enclosure. The tumult and hurly and burly thus created by them frighten the fish, and scatter them away in all directions, with the result that the majority of them escape by jumping, and very few get entangled in the meshes of the net, and die hanging. The remaining fish, and also those in the immediate neighbourhood, hasten to take shelter in the depths, where ordinary fishermen do not go.

"By this the innovators not only fail to get enough of fish to meet the requirements of the public, but they also deprive ordinary boatsmen like us of an honest game. The result of the working with the thattu vala may be enumerated as follows:—

(1) The supply of fish becomes limited
(2) The price of the fish rose very high.
(3) The poor are unable to buy and eat them.
(4) No fish manure was prepared for the last two or three years.
(5) A decline in the fish-curing industry.
(6) Vegetation becomes a failure.
(7) Severe loss to the contractors, to the European agents engaged in the preparation of fish manure.
(8) Poverty among boat-owners and fish-curers.

"Experienced boatmen, fully alive to the advantages of the old and new system, have more than once convened meetings, and resolved to put a stop to the new mode of fishing; but the innovators, contenting themselves that they are in a position to maintain themselves by the small game they get at the expense of a petty sum, often break loose from the resolution, and have recourse to the new practice, to bring about the ruin of the ordinary fishermen like us. Any and every ordinary boatman, from Tanúr to Mattool, will admit that the innovation is the source of poverty among fishermen.

The mere fact that, in every important village, public meetings of both Mukuvers, Christians, and Moplahs, have been held to pass unanimous resolutions, prohibiting the purchase of the fish brought by the innovators, would show that the fishermen in general have set their face against it, and are doing their best to discourage the practice.

"In deprecating the thattu vala system, we beg most respectfully to mention a few of the advantages of the old and established method of fishing. The operation is one without any disturbance. The shoal of fish enter the cone-like net in a body, and, as the net is raised, the fishes go to the bottom of the net. By this we do not in any way disturb another body of fish in the immediate neighbourhood, with which our companion boatmen are engaged. The remainder of the fish, that did not enter the net at the outset, can be caught by the same boatman who has lost it, or by his neighbour without any room for complaint. Almost every kind of fish can be caught in the nets used by us, whereas by the thattu vala only mackerel and sardine could be caught.

"An ordinary pair of fishing boats, with all its requisites, would cost us something between Rs. 3,000 and Rs. 4,000. Your honour may be pleased to take into consideration the fact that, if the thattu vala method of fishing was a thriving or lucrative job, we could have as well kept a thattu vala at the expense of Rs. 30 or Rs. 40, and competed with the innovators, instead of renewing our old and costly method. If all of us were to substitute thattu vala for our own costly nets, the consequence would be that, in the course of a few months, all the fishes that approach the shore would disappear from the sea, and take refuge in the depths.

"In these circumstances we most humbly beg your honour will be graciously pleased to order the discontinuance of the thattu vala, which will be a source of an everlasting welfare among the fishing classes."

November 4th.—By road from Tellicherry to Cannanore. To Colonel Burton, commanding the 25th Madras Infantry, whose recent successful efforts in enlisting Moplahs is well known, I am indebted for the series of photographs, from which the illustrations of the Cannanore fish industry were reproduced. It had been my intention to study, by anthropometric methods, the physique of the Moplah sepoys, who have become most amenable to discipline, while training and good diet have improved their physique, which was good at the commencement. But the time of my visit was not well

selected, as many of them were suffering from the painful and febrile results of plague inoculation prior to their transfer to an infected locality (Bangalore). However, I append (Table IV) the results of measurement of eighteen individuals. As was inevitable in a community recruited by converts from various classes, the sepoys afforded an interesting study in varied colouration, stature, and nasal configuration. One very dark-skinned, and platyrhine individual, indeed, had a nasal index of 92.

TABLE IV.

Moplah Measurements.

Age.	Height : cm.	Shoulders : cm.	Chest : cm.	Dynamometer.	Time in Regiment.	Original home.
17	164·1	39·9	75	68	5 months ...	Ernád taluk.
18	168·6	38·9	81	72	10 ,, ...	Walavanád ,,
19	165·6	40·9	83·5	72	12 ,, ...	Ernád ,,
19	161	42·2	81	71	12 ,, ...	,, ,,
19	168	39·7	82·5	72	1½ year ...	,, ,,
19	171·1	39·8	82·5	67	7 months ...	,, ,,
20	173·2	42·1	88·5	86	11 ,, ...	Walavanád ,,
20	163·4	40·1	85·5	75	3 years ..	Cochin.
20	166·6	42·6	78	70	3 ,, ...	Ernád taluk.
20	165	40·5	81·5	74	11 months...	Ponnani ,,
20	164·8	37·3	77·5	60	2½ years ...	Ernád ,,
21	169·8	40·8	86	75	1½ ,, ...	Walavanád ,,
21	166·6	38·8	80·5	72	2 ,, ...	,, ,,
22	162·4	39	89·5	79	4 ,, ...	Ernád ,,
22	165·4	38·9	83·5	82	1½ ,, ...	Ponnani ,,
22	165·2	40·8	84·5	64	8 months ...	Ernád ,,
22	165	42·5	85	78	10 ,, ...	,, ,,
22	169·4	41	86·5	71	3 years ...	,, ,,

The fish-curing yard, and fishermen's huts, are situated, away from the town, at the southern extremity of the municipal limits; and, to reach it, a walk along the sea-shore, on firm sand left by the out-going tide, was necessary. Discarded on the beach were parrot-fishes (*Tetrodon*), *Triacanthus*, and *Muræna*, in company with dead crustacea (*Matuta*, *Neptunus*, and *Ocypoda*), and the shells of the boring mollusc *Pholas*. The *Tetrodons*, known by natives as sea-frogs, owing to the noise which they make when caught, are said to be very indigestible, or even poisonous. Annelid worms were being caught for bait, between tide-marks, by means of small fish held over the mouths of their burrows to entice them to the surface, and stored in half cocoanut shells. Fishermen were busy repairing their nets, and sales of fresh fish, displayed on the sand or in little boats, were being conducted amid a buzzing accompaniment of flies, and the usual environment of crows. Drying on the sand, in large numbers, were mackerel, of which a considerable shoal had arrived a few days previously.

The yard is well beyond the reach of the monsoon storms, and approached by a long, sandy lane leading to the main entrance. It is the property of Government, and the products of the cocoanut trees within it had been sold by auction on a three years' lease for twenty-nine rupees. The ticket-holders were 9 Moplahs, 1 Native Christian, and 61 Mukkuvans; and the Moplah sheds were concentrated together at one end of the yard.

The prevailing fishes in the yard were mullan (*Equula*), tholayan (*Trichiurus*), charla mathi (*Clupea fimbriata*), adavu (*Lactarius*), kola-kaien (*Dussumieria*), and amberta (*Opisthopterus*). The little mullan sometimes arrives off the coast in large shoals, pursued by kora, shark, seir, and other big fishes, and is cured for local consumption. Neatly arranged on the drying-ground was shark-flesh in the form of rosettes, the flesh being cut in wedge-shaped strips radiating to a centre.

The appended table (Table V) shows the returns of the more important fishes brought to the Cannanore yard from 1893 to 1898.

TABLE V.

Fish Statistics, Cannanore.

Year.	Mackerel.	Sharks.	Cat-fish.	Sardines.	Seer.	Mullan.	Kora.	Total fishes, all kinds.
	MDS.	MDS.	MDS.	MDS.	MDS.	MDS.	MDS.	MDS.
1893-94	8,946	1,403	4,017	8,834	1,735	...	...	35,976
1894-95	4,835	1,433	7,814	4,892	1,041	...	...	31,801
1895-96	12,228	2,450	7,583	13,888	623	280	3	46,944
1896-97	3,028	4,098	7,598	11,763	2,279	4,193	6,537	48,288
1897-98	17,678	2,094	8,281	1,158	21	2,568	96	37,239

During the present fishing season there had been only two fair shoals of sardines, yielding 113 and 107 maunds respectively. The last good season for sardines was four years ago, since which time they have not arrived in quantities sufficient for the purpose of manure. The fishermen maintain that the dearth of sardines on the east coast is due to the absence, in the Bay of Bengal, of the grey ooze, which forms the sea-bottom off the west coast, and constitutes the main food of the sardine. This ooze, in the form of a frothy dark-grey scum, was being rolled in by a heavy ground-swell during my stay at Cannanore, leaving a grey pellicle on shore as the time went out. The failure of the sardine fishery is attributed to the introduction of the thattu vala, which is used by a few Moplah fishermen, and the now expected petition on the subject thereof was submitted. A superstition prevails among the Moplahs that, if sardines are placed near a Moplah mosque in the vicinity of the yard, a failure in the fishery will result.

A quaint Cannanore custom is referred to by Day, who,* writing in 1873, states that "at Cannanore the Rajah's cat appears to be exercising a deleterious influence on one branch at least of the fishing, viz., that for sharks. It appears that, in older times, one fish daily was taken from each boat as a perquisite for the Rajah's cat, or the 'poocha meen' (cat-fish) collection. The cats apparently have not augmented so much as the fishing boats, so this has been commuted into a money payment of two pies a day on each successful boat. In addition to this, the Rajah annually levies a tax of Rs. 2–4–0 on every boat. Half of the sharks' fins are also claimed by the Rajah's 'poocha meen' contractor."

November 7th.—From Cannanore by river to Bekal, on the southern border of the South Canara district. From the landing-stage my despatch box was reluctantly carried to the traveller's bungalow by a very dark, short, and platyrhine Holeya. The Holeyas, who are the field labourers and former agrestic serfs, are to South Canara as the Cherumans and Paniyans are to Malabar. The Bekal river, which was teeming with fish-fry, would, had time permitted, have afforded an excellent opportunity for studying the larval and

---

* *Sea Fisheries of India*, 1873.

post-larval forms of those fishes, which come up the river for spawning purposes.

From my travelling companion, the Manual of South Canara, I learn, at the outset of a visit to a new district, that "among sea and estuary fish the pomfret, black and white, the seer, the mullet, and the whiting are the favourites at European tables, but the species caught in the greatest abundance are the Indian pilchard ('sardine') and the Indian mackerel, both of which are often found in such numbers that a large surplus remains for use as manure. Now that the old-fashioned rough curing with salt-earth has been put a stop to, the fish-curing yards provided by the Salt Department are gradually being resorted to, and a brisk trade in salted mackerel appears to be springing up. Great numbers of seer and other large fish are also caught by Ratnagiri fishermen in the open sea, and brought to the South Canara yards to be cured. Besides the comparatively fine class of fish above mentioned, numbers of coarse fish, such as the dog-fish, the ray and the hammer-headed shark, are eaten by the poorer classes of natives.

"Oysters are met with all along the coast, the best being, perhaps, the small oysters on the rocks about the islands off Udipi, and the large oysters at Coondapoor, and in the back-water at Mogral near Kumbla."

A whale (*Balænoptera indica*, the great Indian fin-whale) was thrown up on shore at Mangalore some years ago, and its skeleton, with the whalebone, is preserved in the Madras Museum.

As bearing on the sea-fisheries of South Canara, the following précis of correspondence relating thereto may be placed on record :—

In 1892 certain members of the fishing community appealed to the Government of India against the orders of the Madras Government declining to withdraw the prohibition of the use of salt-earth for fish-curing purposes. The petition was forwarded to the Government of India by the local Government with the remark that, both in the interests of the people and of the public revenue, it was their policy to prohibit the use of salt-earth, and to open a sufficient number of fish-curing yards, where persons would be free to cure fish with salt issued at cost price. This arrangement, it was pointed out, could not cause any hardship.

The Government of India called for information on the following points:—

(*a*) What number of persons of the fisher class have abandoned their calling since the present system came into operation, and what proportion do they bear to the total number then employed?

(*b*) What quantity of fish has been cured in the district in each year since that period?

(*c*) If the quantity has declined naturally, to what cause is the decline due; and from what source is the demand met, so far as the local supply cannot meet it?

(*d*) What is the average price of salt supplied to the fish-curing yards; whence is the salt brought; and how does the price compare with the cost at which the fishers were able to cure their fish?

(*e*) Is the salt supplied the cheapest procurable; and can the price be reduced?

Meanwhile a despatch was received from the Secretary of State, forwarding a copy of a question asked in the House of Commons by Mr. W. S. Caine concerning the use of salt-earth by fish-curers on the Canara Coast.

The Board of Revenue, after consulting the Collector of South Canara, replied to the various questions *seriatim*, and reported that the fishermen of South Canara have not been affected by the prohibition of the use of salt-earth to anything like the extent represented.

In 1894 a despatch was received from the Secretary of State, in which it was asked whether some other steps could not be taken to promote the convenience of the coast fishermen, and to safeguard their important industry: and Government was requested to consider in what reasonable way the fish-curers on the Indian Coast could be relieved from their disabilities. In referring this despatch to the local Government, the Government of India invited attention to the following facts, under which the fish-curers of South Canara were distinctly at a disadvantage, as compared with those in the adjacent district of North Canara:—

1. Fish-curing yards are more numerous in North than in South Canara.

FISHING VILLAGE, CANNANORE.

2. The price charged by Government for salt issued to fish-curing yards in North Canara varied from 6 to 8 annas, whereas, in the yards in South Canara, it was 12 annas and 1 rupee.
3. In North Canara licenses to use salt-earth were freely issued at all places that are not within ten miles of a curing yard; while, in South Canara, the use of salt-earth was altogether prohibited.

The Local Government, after calling for a full report, passed the following orders :—

(*a*) To open a large number of fish-curing yards, in which the curers could obtain salt at a low price.

(*b*) That the cost of construction and repair of fish-curing yards be borne by Government.

(*c*) Reduction of the price of salt to 10 annas per maund.

Finally, the Government of India ruled that the price of salt supplied to the curers should be reduced to the cost of production and transport, as the prohibition of the use of salt-earth has prevented them from using an article, which they obtained free of cost. It was, therefore, resolved that the price of salt should be reduced to 6 annas 8 pies per maund.

The appended statistics (Table VI) are interesting, as showing the progressive development of resort to the curing yards by the South Canara fishing community. In reviewing these statistics, the Board of Revenue remark that "no information is available as to the quantity of fish cured in South Canara before the prohibition of the use of salt-earth in 1882; but it appears that, in the three previous years the imports and exports of salt fish had averaged 21,827 maunds and 8,939 maunds, respectively, leaving a net average import of 12,888 maunds. The fish-curing yards reached their highest pitch of prosperity in the four years ending 1890–91, during which they dealt annually with a little over 100,000 maunds of fish. The imports and exports of salt fish for this period averaged 19,802 and 27,559 maunds, respectively. The district consequently, instead of importing to meet the requirements of its population, as it did under the old salt-earth system, had become able to export a considerable

surplus of cured fish. This fact is conclusive evidence that, so far from the prohibition of the use of salt-earth having injured the fish industry, it has done exactly the reverse, owing doubtless to the better quality of the article which the fish-curing yards enabled the fishermen to turn out, and the higher price it commanded stimulating them to greater exertions. Referring to a decline in the quantity of the fish brought to the yards, commencing in 1891–92, the Board continue: "There appears to be no reason whatever for supposing that the recent decrease is due to anything except accidental fluctuations in the shoals of fish arriving on the coast, combined possibly with over-fishing in the estuaries by foul means, such as poison and dynamite[19]. Mr. Power is of opinion that the decline in operations in 1894–95 should be attributed, not to the prohibition against the use of salt-earth, but to the variable nature of the fishing seasons. This is corroborated by the statement of one of his Tahsildars, who reports that the decrease is said to be chiefly owing to the unfavourable migration of herrings, and to the consequent decrease in the catches. As the result of his own personal inquiries in the Mangalore taluk, Mr. Welsh states that there has been a falling off in the catches of sea fish due to the failure of shoals and competition by fishermen of other districts, and that the catches of estuary fish also have not been so large as formerly. The Tahsildar pointed out to him a place, which the latter knew to have been swarming with fish in former years, but where few are now to be seen owing to dynamite having been used for their destruction. Even the fishermen, whom the Collector interviewed, are reported to have attributed the decrease at first to that cause, to poison, and to the unusual nets used by visitors, and to have said not a word about the prohibition to use salt-earth, except in a village which he visited on the 6th June, by which time the desirability of ascribing their difficulties to the salt-earth prohibition had occurred to them."

---

[19] In addition to orthodox nets and bait-fishing, "shooting with a Chittagong bow, or bows and arrows, capturing by means of bamboo labyrinths, and poisoning the water by Nux vomica, Cocculus indicus, croton-oil seed, or other deleterious substances, are all common; also damming up and lading out streams, purse-nets in small water-courses, especially in rice fields, catching by the hand or by means of wicker baskets, somewhat resembling the eel traps of Europe, but which are rapidly pressed down over the fish" are resorted to in India—Day: *Fishes of Malabar.*

TABLE VI.

South Canara Fish-curing Statistics.

—	Number of yards opened.	Number of yards at work.	Application.	Fish cured.	Salt issued.
				MDS.	MDS.
Half year ending 31st March 1882 ...	1	1	1	88	6
Do. 30th September 1882	1	...	...	...	...
Do. 31st March 1883 ...	19	2	104	524	191
Do. 30th September 1883	19	...	...	...	...
Do. 31st March 1884 ...	19	9	1,744	18,411	3,716
Do. 30th September 1884	19	2	19	147	16
Do. 31st March 1885 ...	19	10	2,608	20,617	5,749
Do. 30th September 1885	19	3	110	778	131
Do. 31st March 1886 ...	(9 closed) 10	9	6,567	66,477	14,948
Do. 30th September 1886	10	9	501	5,894	1,833
1887–88	12	10	8,508	115,423	19,387
1888–89	12	10	8,591	102,520	17,204
1889–90	10	10	10,030	104,178	14,782
1890–91	10	10	11,312	100,584	16,033
1891–92	10	9	9,592	69,176	10,706
1892–93	9	9	9,975	54,767	7,540
1893–94	9	9	10,074	85,607	11,227
1894–95	10	9	11,236	71,560	10,142

In Malabar the minimum quantity of salt given out to the curers is five seers, in South Canara one seer. In the course of an interview with the fishermen, in 1895, the Collector gathered that they were labouring under certain

disadvantages in getting their fish cured in the yards, among which were :—

1. That salt is not at present issued to the curers in smaller quantities than 5 seers ;
2. That, if the fish brought is below a certain weight, it is kept waiting until enough is got to make up that weight, and sometimes rots before sufficient quantity arrives, and has to be thrown away.

In connection with the first of these grievances, the Deputy Commissioner explained that the minimum quantity of salt to be issued was fixed at 5 seers, to avoid difficulty in collecting the value of any less quantity, especially when fractions of a pie were involved, as the general rate at which salt was issued for fish-curing purposes was annas 8 per maund (of 40 seers). He saw no objection to the reduction of the quantity to one seer, as it might tend to increase the fish-curing operations, and encourage small curers to resort to the yards. As the fish-curing industry has become an exceedingly profitable one in Malabar, no change was, in his opinion, called for.

Salt for the South Canara yards is obtained from Tuticorin, and stored in a depôt at Mangalore, whence it is distributed to the various yards.

After which digression I return to Bekal, where, on the way to the curing-yard, I noticed numbers of children carrying on their heads bundles of the dried stems of sunn-hemp (*Crotalaria juncea*), which is cultivated all along the coast, and used for the extraction, by retting, of fibre for the construction of fishing nets. This plant was, I was assured, shown to the Ganja Commission as ganja (*Cannabis sativa*, Indian hemp). The yard, situated between the sea and the main trunk road, was fenced in by a triple row of screw-pines (*Pandanus odoratissimus*). Drying outside the yard were mackerel, and cat-fish and kora were packed ready for export to Colombo from Cannanore, whither they are taken by pattamar (lateen-rigged sailing craft).

The officer in charge of the yard was a Roman Catholic duffadar in receipt of Rs 9 per mensem. The ticket-holders, 43 in number, were all Mukkuvans, and, as a relief, in the absence of the much abused net, I heard no complaint about the thattu vala. A few of the fishermen own cocoanut topes (groves or orchards), and borrow money from Moplah traders

during the slack season for their maintenance and carrying out repairs of their nets. The boats, forty in number, are made of aini, pún (*Calophyllum tomentosum*), and champak (*Michelia Champaca*). The equipment for a pair of boats is, I was told, four cotton nets, and a single hemp net.

The drying ground was, as regards fish, an absolute blank, and the sole evidence of the object of the yard was in the form of dried scales of bony fishes lying scattered about. Big fish are said to predominate over small at Bekal, with kora as the main source of steady income, though good prices are realised for seir, pomfret, and others. Kora sounds are sold at 4 to 6 annas each, and cat-fish sounds at 1 to 2 pice each. The best season for kora is in August and September, *i.e.*, towards the close of the South-west monsoon.

The yard statistics showed the following results during the last four years: (April—November.)

——	Fish.	Salt.	Value of salt.
	MDS.	MDS.	RS.
1896 (April—November)	4,883	574	358
1897 "	4,972	721	300
1898 "	742	92	38
1899 "	2,532	357	148

The year 1898 was a very bad one for the fishermen. But, during the present year, fishing operations have been more brisk, and good hauls of cat-fish and kora have been secured. The last good season for sardines was 1895, when it was possible to drive for many miles along the coast-line amid the unsavoury surrounding of sardines drying for manure. Mackerel, sardines, and munangu (*Engraulis*) are bought up for manure by local cultivators of tobacco, which thrives on this part of the coast. My recollection of the manure-heaps on the road between Bekal and Kaseragode is still vivid. The boats brought in, during the time of my halt at Bekal, amberta, white and black pomfret, Trichiurus, mullan, tholari, young cat-fish, kora, adavu (*Lactarius delicatulus*), soles, kolachi or kolakaien (*Dussumieria acuta*) and prawns. Nowhere, during my tour, did I see prawns caught in such large numbers as at Tanúr, and they are said to be most abundant in South Malabar. Devilled prawns, soles,

whiting, and pomfret were a grateful addition to camp dietary in a district not celebrated for the quality of its mutton.

Dredging during two days realised a number of molluscan shells, coarse in contrast with those from stations further south, and consisting mainly of bivalves from a neighbouring shell bed. A very similar shell-bank was found by the dredge off Kasaragode, whither we proceeded on November 10th. Here again, the thattu vala is not used, as the fishermen, both Mukkuvan and Moplah, believe that it permanently frightens the fish away, and harmony prevails. The ticket-holders in the yard, 33 in number, were all Moplahs. The large, spacious yard, with the salt-shed in the middle, is situated on an isolated sand-spit near the mouth of a tidal river, where pattamars were taking in a cargo of fish consigned to Mangalore. The yard, on the occasion of my inspection, contained a mean show of fish, kora, small sharks and cat-fishes, and mackerel, from a recent small shoal, stacked in parallel rows, and covered over by six layers of coir matting. The only grievance was the absence of sardines during the last few years, which the Moplahs accept philosophically, and attribute to the act of God. As we were leaving the yard, a single boat arrived, with a few handfuls of nettalu (*Engraulis*; white bait) as the poor result of six hours' fishing; but the crew were made happy with a *pour boire*, wherewith to drown their disappointment in arrack.

November 11th and 12th—A "musical ride" in a manjil from Kasaragode to Mangalore, with a halt at Manjeshwar, where I was greeted, on arrival at the travellers' bungalow, by the vinaceous-red-backed batrachian *Rana malabarica*, which never appears on the east coast.

Mangalore, the chief town of the South Canara district, is situated on an extensive backwater formed by the convergent mouths of the Nétravati and Gurpúr rivers, into which Arabian bágálas and country sailing-craft enter in considerable numbers. The town abounds in church bells and Native Christian females, who, on festal days, and on the way to church, may be recognised by the white mantle (vol), which is drawn over the head, and covers the entire body. More interesting, however, from an ethnological standpoint, was a small party of dark-skinned Koragas, who, until recent years, wore a primitive garment of leaves, now replaced by a more up-to-date cotton cloth. "This tribe," the Manual tells us, "is divided into three clans—the Ándé or Ada Koragas,

Vastra Koragas, and Soppu or Soppina Koragas. Formerly the first mentioned was considered so unclean that they were not permitted to spit on the public way, but had a pot suspended from the neck, which they used as a spittoon." It was noticeable that, as I passed down the line during my inspection, the females, as a mark of respect, removed the cotton wrapper with which their bosoms were covered.

Mangalore indulges in three fish-curing yards, of which the Bokkapatnam yard was selected for inspection. The yard is divided into neat oblong blocks, one for each curer, with boundary railings of cocoanut leaves, and a central track leading to the salt depôt. For night work a lamp was fixed on the top of a long pole outside each shed. Hanging on the wall of the yard office, my inspecting eye caught sight of the saw of a saw-fish, which, on enquiry, was said to be used as a "threatening instrument" in the yard. The ticket-holders were nine Moplahs and thirteen Mogers (Tulu fishermen). Some of the Mogers, I was informed, use the thattu vala (or áchi vala), which forms the subject of discussion at local indignation meetings. A few years ago the hated nets were cut to pieces, and thrown into the sea, as a protest against their employment. A free fight ensued, with the result that nineteen individuals were sentenced to a fine of Rs. 50 and three months' imprisonment.

Working in the yard were a number of Holeiya cooly women, clad in areca palm caps, blue body-cloth, stained and dirty, but hanging in graceful folds, heavy brass and leaden bangles, brass and bead necklets, and cadjan rolls in the dilated ear-lobes.

The fishery returns during corresponding periods of the last four years showed the following results :—

1896	(April 1st to November 12th)	..	4,173	maunds.
1897	do.	..	2,642	,,
1898	do.	..	3,667	,,
1899	do.	..	8,405	,,

The present season was a good one, as compared with recent years, and the increase in fishing operations was attributed to good catches of mackerel, and to the enlargement of the yard, with consequent increase in the number of curers. The most plentiful fish in the yard, at the time of my visit, were mackerel, manungu, sharks, seir, skates, and pomfret. Fish are said to be imported into Mangalore from the Kurrachee coast to the value of Rs. 50,000 to Rs. 60,000

annually. The godowns (warehouses) of several Moplah merchants, which I visited, contained considerable stores of fish-manure for coffee-planters, and sharks, cat-fish, kora, and mackerel, ready for shipment to Colombo.

For the appended statistics (Tables VII and VIII) relating to the Mangalore trade in fish, shark-fins, and fish-maws, I am indebted to Mr. D. J. McFarlan, Agent to Messrs. Arbuthnot & Co.

TABLE VII.

Quantity and Value of Salted Fish exported from Mangalore to Colombo, 1892–99.

—	Salt-fish.		Fish-manure.		
	LBS.	RS.	TONS.	CWT.	RS.
1892–93 ...	1,723,406	1,38,365	...	...	...
1893–94 ...	1,812,660	1,71,085	...	...	...
1894–95 ...	1,717,534	1,41,734	29	11	889
1895-96 ...	2,340,386	2,33,291	3	12	108
1896–97 ...	1,449,281	1,43,154	...	...	...
1897–98 ...	1,942,413	1,92,430	...	...	...
1898–99 ...	2,635,990	2,87,817	...	...	...

TABLE VIII

Quantity and Value of Shark-fins and Fish-maws exported from Mangalore, 1892–99.

—	To Bombay.		To Malabar.		Ports within the South Canara District.		To London.	
	LBS.	RS.	LBS.	RS.	LBS.	RS.	LBS.	RS.
1892–93 ...	61,587	25,954	...	...	...	...	...	...
1893–94 ...	51,933	22,452	448	232	28	4	...	...
1894–95 ...	63,438	31,384	...	...	...	...	...	...
1895–96 ...	52,479	29,285	14	3	...	...	...	...
1896–97 ...	46,424	25,470	28	6	...	...	...	...
1897–98 ...	79,212	44,197	84	60	...	...	4,200	6,300
1898–99 ...	34,300	19,339	504	1,000	...	...	6,048	13,960

November 15*th*, 16*th*. From Mangalore to Malpe. In crossing the Parvanjee river by the ferry-boat, an enormous shoal of big rhizostomids was noticed. The chuttram (rest-house) at Malpe is situated within easy range of the stench from the curing-yard, which was wafted southward as the daily sea-breeze set in, and permeated both food and clothing. In front of the chuttram is an extensive tidal mud-flat, whereon do assemble, both by day and night, quarrelsome, hoarse-voiced, low-bred and ownerless pariah dogs, glutted with a surfeit of fish dietary. This flat, apart from dogs, was crowded with the mud-loving molluscs *Cerithium*, *Nerita*, and *Telescopium*, and the calling crab *Gelasimus*. The shells of *Telescopium* I have seen on the mud-flats of Narrikál, near Cochin, looking like the spikes of the helmets of a submerged British Regiment.

To Malpe, during the fishing season, come fishermen with a flotilla of keeled and outrigged sailing boats from Ratnagiri in the Bombay Presidency. Hither also come fishermen from Goa, who can be easily distinguished by the copper hue of their skin, and rosary of black and white beads, often supplemented by a red bead necklet. The Goanese fishermen migrated to Malpe owing to the disturbances and political troubles in Portuguese India in 1895. The reasons given by the Ratnagiri fishermen for coming southward are that fish are not so abundant off their own coast, competition is keener, and salt more expensive. Moreover, the crystals of Bombay salt are too large for successful curing, and "do not agree with the fish, of which the flesh is turned black." If, they said contemptuously, they were to sun-dry fish by the local method, their people would chaff them for bringing back, not fish, but dried cow-dung for fuel. It is noted in the Annual Report of the Salt Department, 1894–95, that the increase in the proportion of salt issued to fish cured was due to the peculiar method of curing adopted by the Ratnagiri fishermen, which requires a large proportion of salt. In the system of curing as adopted by them, big fishes are split longitudinally on each side of the vertebral column, and, after the salt has been sprinkled on by hand, neatly stacked in alternate layers at right angles to each other. Salt is applied in the following proportions:—

1st day, 5 seers—1 maund of fish.
2nd day, 5 seers—1 maund of fish.
3rd day, 3 seers—1 maund of fish.

FISH-YARD, MANGALORE.

The fish are then allowed to remain without further treatment, amid red-eyed blue-bottle flies and maggots, until the tenth day, when they are removed to a shed outside the yard, and are ready to be sent away. Fish thus cured can, it is said, be kept for many months without deteriorating. The local fishermen, who resort to sun-drying, apply salt in the proportion of 1 : 8 if the fish is quite fresh, and 1 : 7 if it is slightly tainted. Spoiled fish is not brought into the yard, but dried outside, and sold for manure.

The Ratnagiri boats go well out of sight of land to the fishing ground, where they catch seir, pomfret, kora, and other big fish near the surface, and sharks in deeper water. The fishing entails hard work, as the boats return to the shore about 10 A.M., and start off again between 1 and 2 P.M., to remain at sea until the following morning. Through the night 2 men sleep, 2 men keep a look-out for boats and steamers fouling the nets, and 2 men take charge of the nets from a small rowing boat. If the fishing is not good near head-quarters, the Ratnagiri boats may go as far as Mangalore. In this case, to prevent decomposition from setting in before their return, to the Malpe yard, they sprinkle over the fish a little "bazár salt," which they take in the boat with them. To the Ratnagiri fishermen the seir is the most valuable and lucrative fish, and they say that it does not pay them to come so far from home, and fish for the smaller kinds. Under existing arrangements, by which clashing of interests is avoided, the fishery at Malpe is divided into two zones, viz , the deep sea fished by the large Ratnagiri boats, and the shallow littoral water by the smaller local and Goa boats, which frequently catch good hauls of the smaller fishes between the belt of islands and the shore, where there is sufficient depth to admit steamers of light draft, *e.g.*, the Sheppard coasters. On the Daria Bahadurghur island a new light-house is about to be erected, and I foresee that the light thereof may, in bad seasons due to natural causes, be charged with frightening away the shoals.

The establishment at Malpe consists of a Sub-inspector (also in charge of the abkári depot), three yard peons, and two peons in the salt golah (warehouse) outside the yard. The curers were as follows :—

	Registered.	Resorted to yard this year.
(*a*) Ratnagiri—		
Hindu..	41	16
Muhammadan ..	41	15

		Registered.	Resorted to yard this year.
(*b*) Local—			
Muhammadan	..	80	52
Christian	.. ..	41	33
Billava	.. ..	6	3
Moger	.. ..	2	1

The Billavas, who are the numerically largest caste in the district, are the hereditary toddy-drawers, but many of them, at the present day, are agriculturists and labourers.

The coolies in the yard were, at the time of my visit, busy stuffing split and gutted mackerel with salt. After gutting, the fish are taken down to the sea in baskets, thrown into a rope crate, and swung in the water between two men. They are then returned to the baskets, each of which has the curer's number marked on it, and taken to the yard to be cured. On shore, where the guts had been thrown into the sea, were a host of gulls and terns. From the meshes of the nets were extracted various univalve shells inhabited by hermit-crabs. Rejected on shore were *Triancanthi* and flattened jelly-fishes. Very abundant between tide-marks was a star-fish (*Astropecten*), which, in its progress, left a complex trail, side by side with that of the colonial gastropod *Rotella vestiaria*, and the sand pellets thrown out from the burrows of the busy *Gelasimus*. Drying on shore, without previous salting, were great piles of mackerel for future sale as manure; and I was summoned from the dinner-table to inspect, amid these piles, the carcase of an immense skate (*Trygon*), whose last act, as she lay dying on the sand, was to continue the species by bringing forth twelve young ones, who were promptly salted.

The fish in the yard consisted mainly of seir, mackerel, young skates removed *ex utero*, cat-fishes, pomfret, mullan, manungu, 'soles,' amberta, kora, and trichiurus. Seir, mackerel, and pomfret are said to be in full roe in December.

In the fishing village, which is in close proximity to the curing-yard, the population dwells in quarters according to class, and forms separate communities, each with its own beliefs and superstitions, mode of life, and dietary. The huts are situated beneath the grateful shade of yellow-fruited cocoanuts, and the village is intersected by fresh-water channels used for the purpose of ablution and drinking. At the entrance to the village, on the seaward side, the owner

of a coffee-shop was daily doing a brisk business in unalcoholic drinks and light refreshments. A Native Christian curer, who interviewed me, told me that, as the result of a recent six days' good catch of mackerel, he hoped to make a clear profit of Rs. 50, and to secure a profit of Rs. 200—Rs. 300 on the whole season. The profit depends much on the state of the market at Colombo; the value of mackerel ranging between Rs. 1–6–0 and Rs. 3 per 1,000.

My arrival at Malpe was well timed, so as to be coincident with the return of shoaling mackerel. The best catches of fish, during the present season, as recorded in the yard returns, were approximately as follows:—

——	Big.	Small.	Salt.	Salt value.
	MDS.	MDS.	MDS.	RS.
October 30 ...	159	593	114	47
November 4 ...	224	2,154	322	134
,, 5 ...	404	1,346	200	83
,, 6 ...	269	922	224	93
,, 7 ...	233	430	137	57
,, 9 ...	468	444	159	66
,, 12 ...	162	1,025	159	66
,, 14 ...	732	532	187	78
,, 16 ...	51	40	56	23
,, 17 ...	162	1,235	205	85
,, 18 ...	61	1,144	178	74
,, 19 ...	4	1,945	267	111

The big fishes were mostly seir, and the small mackerel. On the 19th the Ratnagiri fishermen were not out, as, after a series of successful hauls, they ceased operations on account of the moonlight, and beached their boats, so as to give them a coating of oil. The release from sea-work was celebrated by an open-air smoking concert with band and wild choruses.

On November 18th a big haul of mackerel, with coincident youthful sharks, was brought ashore several miles south

of Malpe about midnight, and gutted immediately. At 6 A.M. on the following morning a procession of coolies was discovered, each with a basket-load of fish on his head, making their way to the yard; and the procession, in a continual stream to and fro, lasted until 10 A.M. While the introduction of the great mass of fish, and distribution of salt were going on, dried and cured fish were being passed out of the yard by measure or weighment, and, to add to the pressure of work, the Ratnagiri boats, with sails swelled before the gentle breeze, arrived ashore with their haul of big fishes.

Another big haul of mackerel, which I witnessed, was caught at 10 A.M. four miles south of Malpe, and did not reach the yard until 5 P.M., by which time the flesh was, from exposure to the sun, of indifferent quality as compared with that of mackerel brought to the yard from a catch two hours previously close in shore off the fishing village. The charges in connection with the preparation of the mackerel brought from the more distant locality were, as summed up by a fish-curer, as follows :—

Gutting	2½ annas	per 1,000.
Washing	2 pies	,,
Transport by boat	9 ,,	,,
Transport to yard	½ anna	,,
Salting .. .. about	2 annas	,,
Washing	½ anna	,,
Drying	½ ,,	,,
Turning	2 pies	,,
Transport to outside yard ..	2 ,,	,,

During the census week, December 1st to 7th, 1899, the quantities of mackerel caught in the Udipi circle, in which Malpe is situated, were as follows :—

	Number.
December 1st	1,240,673
,, 2nd	1,914,396
,, 3rd	1,490,462
,, 4th	1,272,747
,, 5th	648,700
,, 6th	386,165
,, 7th	290,304
Total number ..	7,243,447
Total maunds ..	13,581

In his report on the census, the Assistant Inspector writes that " the coast line of the Udipi circle is about 66 miles, and this distance was divided into 22 sections. Every boat, which brought fish to the sea-shore or to the backwater crossing a bar, both day and night, was closely examined, and both the number and average weight were recorded in a register. The catches would have been even greater, but for cloudy weather and rough sea on two days. The heavy catches were by means of deep-sea nets, called maribala or rampini, from Goa. These nets are used in some cases by local men also, but, when Goa men are employed, the agreement between them and the local curers is that they should receive 1,000 rupees for every 33 trips, or one rupee for every 1,000 mackerel; the price for the other kinds of fish being settled at the time of catch according to demand.

As I have already done in the case of sardines, I place on record the statistics of the mackerel and seir fisheries throughout South Canara and Malabar, from north to south, during the three years 1896—98.

A. MACKEREL.

Yard.	1896.	1897.	1898.
	MDS.	MDS.	MDS.
Gangoli	23,562	2,977	4,267
Hankarkotta	20,717	4,784	6,989
Malpe	36,583	9,549	26,715
Bokkapatna	4,505	334	1,983
Ullal	2,571	465	1,831
Manjeshwar	3,126	357	5,850
Kumbla	2,753	410	2,347
Kasergode	1,631	697	2,776
Bekal	4,300	512	1,340
Hosdrug	361	38	608
Mangalore	1,614	195	1,169
Taikadpara	95	152	524
Madai	2,811	497	10,341
Azhikal	1,607	402	4,713
Baliapatam	2,949	671	5,017
Cannanore	11,231	3,028	17,678
Tellicherry	17,950	5,055	23,794
Kurichi	2,862	1,261	8,424
Madakarai	4,885	925	5,243
Badagara	8,554	3,104	8,294
Quilandi	13,909	7,926	18,253
Elathur	1,269	1,894	3,135
Pudiappu	3,445	1,882	4,840

A. MACKEREL—*continued.*

Yard.	1896.	1897.	1898.
	MDS.	MDS.	MDS.
Calicut, North	3,394	4,376	12,481
Calicut, South	3,175	2,152	5,422
Beypore, North	1,147	950	1,893
Beypore, South	4,722	2,803	4,908
Parpangadi	11,061	2,198	24,153
Tanur	4,667	3,127	41,525
Paravannah	7,101	2,101	9,060
Kuttai	3,979	1,460	10,049
Ponnani	11,187	2,964	15,202
Puthu Ponnani	1,210	8,359	1,583
Veliyangode	1,696	1,136	6,663
Palapatty	2,732	1,596	9,277
Edakazhiyur	5,785	1,420	18,943
Chowghat	4,545	2,652	19,660
Blangad	3,663	1,454	14,361
Vadanapalli	2,838	1,886	19,236
Mannalankannu	2,282	1,002	9,184
Cochin	2,872	386	935
Kurikuzhi	2,434	611	9,291
Bemballore	77	287	1,989
Total ...	253,857	90,035	401,946

B. SEIR.

Yard.	1896.	1897.	1898.
	MDS.	MDS.	MDS.
Gangoli	19	15	5
Hankarkotta	23	217	30
Malpe	3,792	4,096	3,998
Bokkapatna	29	91	41
Ullal	8	31	...
Manjeshwar	278	659	64
Kumbla	98	327	38
Kasergode	...	8	...
Bekal	28	72	482
Hosdrug	20	14	283
Mangalore	56	61	51
Taikadpara	...	...	...
Madai	...	238	...
Azhikal	67	128	28
Baliapatam	...	...	...
Cannanore	618	2,279	21
Tellicherry	434	2,145	822

B. SEIR—*continued.*

Yard.	1896.	1897.	1898.
	MDS.	MDS.	MDS.
Kurichi	61	262	87
Madakarai	...	1,372	27
Badagara	902	1,127	263
Quilandi	8	249	30
Elathur...	...	368	7
Pudiappu	1	508	4
Calicut, North	48	1,033	139
Calicut, South	58	742	...
Beypore, North	1	806	...
Beypore, South	...	19	...
Parpangadi	1,108	2,101	367
Tanur	2,133	2,345	853
Paravannah	76	419	2
Kuttai	...	964	67
Ponnâni	86	167	41
Puthu Ponnáni	21	13	14
Veliyangode	26	78	11
Palapatty	111	109	13
Edakazhiyur	610	578	129
Chowghat	374	154	73
Blangad	374	234	24
Vadanapalli	760	138	55
Mannalankannu	151	128	19
Kurikuzhi	9	...	...
Bemballore	...	26	...
Total ...	12,388	24,321	8,088

Bringing together the results of the sardine, mackerel, and seir fisheries of Malabar and South Canara during 1896—98, the results work out as follows :—

Yard.	1896.	1897.	1898.
	MDS.	MDS.	MDS.
Sardines	387,295	253,649	28,702
Mackerel	253,857	90,365	401,946
Seir	12,388	24,321	8,088

In conclusion, I would invite attention to the appendix, wherein I have tabulated the information relating to catches of 20 maunds and over of the fishes returned in the monthly statements for the Calicut and Ponnáni circles, in which (especially the latter) the forms were more intelligently filled in than in the Northern Circles. The evidence of the returns, though they are an initial and experimental attempt at precise classification, is sufficient to show that, with uniform care and accuracy at the various centres of observation, a valuable record of the movements of fishes and the condition of the fishing industry can be obtained. And I propose to submit immediately to the Board of Revenue a modified scheme of investigation, based on examination of the returns, and the practical experience gained during my wandering on the west coast.

LIST OF FISHES REFERRED TO IN THE PRESENT NOTE.

Arius, sp. 'cat-fish,' yata or eta.
Clupea longiceps, 'sardine,' nalla mathi.
Clupea fimbriata, 'sardine,' chala mathi.
Clupea lile, 'sardine,' veloori.
Opisthopterus tartoor, amberta.
Engraulis, sp., manangu.
Engraulis, sp., nettalu.
Dussumieria acuta, 'sardine': kolachi, kola kaiyan.
Sciæna, sp. kora.
Trichiurus, sp. ribbon fish, thalayan.
Caranx, sp. horse-mackerel, para, kanayan para.
Corinemus lysan, pala.
Equula, sp. mullan.
Lactarius delicatulus; adu, adavu.
Stromateus sinensis, white pomfret, vella akoli.
Stromateus niger, black pomfret, karutha akoli.
Scomber microlepidotus, mackerel, ila.
Cybium guttatum } seir; aikoora.
Cybium commersonii } seir; aikoora.
Cynoglossus, sp. 'sole,' manthal.

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1898. 1st Nov. ...	Kuttai ...	C. fimbriata ...	10 yards ...	Surface ...	Sky clear, sea calm.
5th Nov. ...	Tanur ...	C. lile	1½ miles ...	Surface ...	Sky clear, sea calm.
6th Nov. ...	Tanur ...	C. lile	2½ miles ...	Surface ...	Sky cloudy, sea calm.
6th Nov. ...	Tanur ...	C. longiceps ...	2 miles ...	......	Sky clear, sea calm.
6th Nov. ...	......	Seir	2 miles ...	......	Sky clear, sea calm.
6th Nov. ...	Ponnáni ...	C. lile	1½ miles ...	Surface ...	Sky cloudy, sea rough.
7th Nov. ...	Parpangadi ...	C. longiceps ...	1 mile ...	Surface ...	Bright ... ...
7th Nov. ...	Kuttai ...	C. fimbriata ...	1 mile ...	Surface ...	Sky cloudy ...
7th Nov. ...	Ponnáni ...	C. lile	2½ miles ...	Surface ...	Sky clear, sea calm.
12th Nov. ...	Edakazhiyur...	Black pomfret...	5 miles ...	Surface ...	Cloudy, raining ...
14th Nov. ...	Puthu Ponnáni.	C. longiceps ...	1 mile ...	Surface ...	Cloudy ... ...
22nd Nov. ...	Ponnáni ...	C. lile	1¾ miles ...	Surface ...	Sky clear, sea calm.
23rd Nov. ...	Kuttai ...	C. fimbriata ...	1 mile ...	Surface ...	Sky clear, sea calm.
24th Nov. ...	Veliyangode ...	C. lile	4 miles ...	......	Sky clear, sea calm.
27th Nov. ...	Calicut, North.	C. fimbriata ...	3 miles ...	2 fathoms.	Sky clear, sea calm.
29th Nov. ...	Calicut, North.	C. fimbriata ...	3 miles ...	2 fathoms.	Sky clear, sea calm.
29th Nov. ...	Calicut, North.	Seir	10 miles ...	5 fathoms.	Sky clear, sea calm.
1st Dec. ...	Calicut, North.	Seir	10 miles ...	4 fathoms.	Sky clear, sea calm.
11th Dec. ...	Mannalankannu	C. longiceps ...	¼ mile ...	Surface ...	Sky clear, sea calm.
19th Dec. ...	Parpangadi ...	C. longiceps ...	4½ miles ...	Surface ...	Sky clear, sea calm.
1899. 18th Jan. ...	Pudiappu ...	C. longiceps ...	1 mile ...	......	Sky clear, sea calm.
19th & 23rd Jan.	Madai	Sardines (not identified).	3–11 miles.	......	Sky clear, sea calm.
23rd Jan. ...	Cannánore ...	Seir	10 miles ...	......	Sky clear, sea calm.
23rd Jan. ...	Cannanore ...	Seir	12 miles ...	......	Sky clear, sea calm.

DIX.

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
5 p.m. ...	Thread ...	45	Offal ...	......	......	Kora.
10-30 a.m.	Thread ...	108	Small fish ...	......	......	Kora; adu.
10 a.m. ...	Thread ...	54	......	......	......	Kora; adu.
9 a.m. ...	Thread ...	58	Mud	All young.	......	......
9-30 a.m.	Thread ...	32	Nalla mathi ...	All young.	......	......
2 p.m. ...	Twine ...	30	......	......	......	Charoo.
1 p.m. ...	Thread ...	220	......	......	......	Kora.
1 p.m. ...	Thread ...	227	......	All young.	......	Mackerel.
11 p.m. ...	Twine ...	30	......	......	......	Charoo.
Night ...	Thread ...	20	......	......	......	......
Noon ...	Thread ...	243	......	Most young	......	Shark.
1 p.m. ...	Twine ...	150	......	......	F. 2 pies; S. 6 pies per 100.	Cat fish.
4 p.m. ...	Thread ..	129	Offal	......	......	Mackerel.
9 a.m. ...	Thread ...	125	Mud	......	......	......
1 p.m. ...	Oda vala.	100	......	Young ...	......	Charu; pala.
2 p.m. ...	Oda vala.	75	......	Young ...	......	......
9 a.m.—2 p.m.	Hooks ...	25	Kora and chala mathi.	......	F. Rs. 5; S. Rs. 5-8 per maund.	Skate.
8 a.m.—1 p.m.	Hooks ...	40	Small cat fish.	......	......	Mackerel.
4 p.m. ...	Thread ...	25	Mud	......	......	Kora.
...	Thread ...	25	......	......	......	Mackerel.
11 a.m. ...	Veechil vala.	28	......	Young ...	F. Rs. 1-2; S. Rs. 1-6 per 1,000.	Shark; mackerel.
Night ...	Noria vala and peru vala.	150 to 700	......	......	......	......
2-5 p.m. ...	Hook net.	32	Mackerel ...	......	......	......
8 a.m.—3 p.m.	Peru vala.	48	......	......	......	......

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899.					
25th Jan. ...	Cannanore ...	Sardines (not identified).	12 miles ...	......	Sky clear, sea calm.
27th Jan. ...	Cannanore ...	C. longiceps ...	18 miles ...	Surface ...	Sky clear, sea calm.
28th Jan. ...	Cannanore ...	C. longiceps ...	12 miles ...	Surface ...	Sky clear, sea calm.
28th Jan. ..	Tellicherry ...	Sardines (not identified).	3 miles ...	Surface ...	Sky clear, sea calm.
30th Jan. ...	Cannanore ...	C. longiceps ...	12 miles ...	......	Sky clear, sea calm.
5th-25th Feb.	Madai ...	Sardines (not identified).	3 miles to close in-shore.	Surface ...	Sky clear, sea calm.
13th Feb. ...	Madai ...	Black pomfret.	In-shore.	12 fathoms.	Sky clear, sea calm.
13th Feb. ...	Puthu Ponnáni.	Seir	3 miles ...	......	Sky clear, sea calm.
14th Feb. ...	Madai ...	Black pomfret ...	5 miles ...	......	Sky clear, sea calm.
14th Feb. ...	Puthu Ponnáni	Seir	3 miles ...	......	Sky clear, sea calm.
14th Feb. ...	Puthu Ponnáni	Seir	3 miles ...	......	Sky clear, sea calm.
22nd Feb. ...	Tellicherry ...	Sardines (not identified).	6 miles ...	......	Sea rough, high wind.
15th March.	Tellicherry ...	C. fimbriata ...	5 miles ...	......	......
11th May ...	Kurikuzhi ...	C. lile	4 miles ...	Surface ...	Sea calm ... ...
12th May ...	Mannalan-kannu.	C. fimbriata ...	4 miles ...	Surface ...	Sea calm ... ...
17th May ...	Kurikuzhi ...	C. lile	6 miles ...	Surface ...	Sea calm ... ...
2nd Aug. ...	Badagara ...	C. lile	6 miles ...	......	Sky clear, sea calm.
7th Aug. ...	Tanur ...	C. lile	2 miles ...	Surface ...	Sky cloudy, sea calm.
21st Aug. ...	Ponnáni ...	C. lile	2½ miles ...	Surface ...	Sky clear, strong wind.
28th Aug. ...	Blangad ...	Black pomfret ...	15 miles ...	4 fathoms.	Sky clear, sea calm.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
2–4 p.m. ...	Peru vala.	73	Mud	......	......	Shark.
3–6 a.m. ...	...	22	Mud	......	......	......
3–5 p.m. ...	...	25	......	......	......	......
...	...	107	......	......	......	......
4–5 p.m. ...	Hemp net.	204	......	......	......	......
......	......	Daily catches ranging from 700 to 16 maunds	......	......	......	......
Noon ...	......	50	......	All large.	......	......
2–3 p.m. ...	Hook ...	38	Small fish ...	F. As. 7; S. As. 10 each.	......	Shark; kora; pala.
9 a.m. ...	Thattu vala.	130	Small fish ...	......	......	......
2–3 p.m. ...	Hook ...	23	......	......	......	......
2–3 p.m. ...	Hook ...	22	......	......	......	......
10 a.m. ...	......	33	......	......	......	......
6–11 a.m.	Peru vala.	25	......	Full grown.	......	......
3 p.m. ...	Thread ...	33	......	......	......	Mackerel.
2 p.m. ...	Thread ...	23	......	.....	......	Mackerel.
2 p.m. ...	Thread ...	21	......	......	......	Mackerel.
7 a.m. ...	Veechil vala.	80	......	......	F. As. 12 per maund.	......
2 p.m. ...	Thread ...	21	......	......	......	Kora; manangu; thalayan.
Noon ...	Thread ...	241	......	......	......	Cat fish; mackerel.
Midnight.	Vakku vala.	164	Mud	......	F. Rs. 6; S. Rs. 8 per 100.	Shark; cat fish; manthal.

APPEN

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899.					
29th Aug. ...	Blangad ...	Black pomfret ...	15 miles ...	4 fathoms.	Sky clear, sea calm.
29th Aug. ...	Badagara ...	Black pomfret ...	5–8 miles.	5 fathoms.	Sky clear, sea calm.
3rd Sept. ...	Blangad ...	Black pomfret ...	18 miles ...	5 fathoms.	Sky clear, sea calm.
3rd Sept. ...	Chowghat ...	Black pomfret ...	12 miles ...	11 fathoms.	Sky clear, sea calm.
4th Sept. ...	Blangad ...	Black pomfret ...	20 miles ...	5 fathoms.	Sky clear, sea calm.
4th Sept. ...	Chowghat ...	Black pomfret ...	10 miles ...	10 fathoms.	Sky clear, sea calm.
7th Sept. ...	Blangad ...	Black pomfret...	20 miles ...	5 fathoms.	Sky clear, sea calm.
9th Sept. ...	Blangad ...	Seir	20 miles ...	5 fathoms.	Sky clear, sea calm.
10th Sept. ...	Calicut, North.	Black pomfret ...	20 miles ...	3 fathoms.	Cloudy, sea calm.
10th Sept. ...	Bemballur ...	C. lile	5 miles ...	Surface ...	Sky clear, sea calm.
16th Sept. ...	Ponnáni ...	C. lile	2½ miles ...	Surface ...	Sky clear, strong wind.
16th Sept. ...	Chowghat ...	Black pomfret ...	15 miles ...	4 fathoms.	Sky clear, sea calm.
21st Sept. ...	Ponnáni ...	C. lile ...	2½ miles...	Surface ...	Sky clear, strong wind.
22nd Sept. ...	Cochin ...	C. fimbriata ...	6 miles ...	Surface ...	Sky clear, sea calm.
23rd Sept. ...	Badagara ...	Black pomfret ...	6–9 miles.	2–10 fathoms.	Sky clear, sea calm.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
Midnight.	Vakku vala.	844	Mud	......	......	Shark; skate; mullan; kora; cat fish.
Noon ...	Oda vala.	81	......	......	......	Skate; kora; mackerel.
1 a.m. ...	Vakku vala.	56	Mud	Majority young.	F. Rs. 6; S. Rs. 8 per 100.	Shark; kora; cat fish.
Night ...	Vakku vala.	311	......	......	......	Shark; kora; cat fish; mullan; manthal.
1 a.m. ...	Vakku vala.	391	Mud	......	......	Shark; kora; cat fish.
Night ...	Vakku vala.	517	......	......	......	Shark; kora; cat fish; mullan; manthal.
1 a.m. ..	Vakku valu.	219	Mud	......	......	Shark; kora; cat fish.
2 a.m. ...	Vakku vala.	25	......	Majority young.	F. As. 8; S. As. 10 each.	Shark; kora; cat fish; manthal.
Noon ...	Oda vala...	32	......	......	F. Rs. 10; S. Rs. 11 per 100.	Manthal (135 maunds); shark; skate; cat fish; mackerel.
11 a.m. ...	Thread ...	30	......	All young.	F. Rs. 1-8-0; S. Rs. 2 per 1,000.	......
1 p.m. ...	Thread ...	......	......	......	F. Rs. 1-8-0; S. Rs. 2-4-0 per 1,000.	Shark.
9 a.m. to 4 p.m.	Vakku vala.	381	......	All young.	F. Rs. 5; S. Rs. 6 per 100.	Shark; cat fish.
Noon ...	Thread .	241	......	......	......	Cat fish; mackerel.
8 a.m. ...	Thread ...	29	......	Majority young.	F. 6 pies; S. 1 anna per 100.	......
11 a.m. ...	Veechil vala.	20	......	......	......	......

APPEN

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899. 23rd Sept. ...	Blangad ...	Black pomfret ...	14 miles ...	1½ fathoms.	Sky clear, sea calm.
23rd Sept. ...	Cochin ...	C. fimbriata ...	6 miles ..	Surface ...	Sky clear, sea calm.
24th Sept. ...	Cochin ...	C. fimbriata ...	6 miles ..	Surface ...	Sky clear, sea calm.
24th Sept. ...	Tanur ...	Black pomfret ...	3½ miles...	Surface ...	Sky clear, sea calm.
24th Sept. ...	Blangad ...	Black pomfret ...	10 miles ...	1 fathom.	Sky clear, sea calm.
30th Sept. ...	Badagara ...	C. longiceps ...	6-8 miles.	2–5 fathoms.	Sky clear, sea calm.
30th Sept. ...	Chowghat ...	Seir	16 miles ...	3 fathoms.	Sky clear, sea calm.
1st Oct. ...	Badagara ...	C. longiceps ...	6–8 miles.	4–6 fathoms.	Sky clear, sea calm.
1st Oct. ...	Blangad ...	White pomfret.	18 miles ...	4 fathoms.	Sky clear, sea calm.
1st Oct. ...	Chowghat ...	White pomfret.	20 miles ...	4 fathoms.	Sky clear, sea calm.
1st Oct. ...	Vadanapalli ...	White pomfret.	12 miles ...	12 fathoms.	Sky clear, sea calm.
2nd Oct. ...	Blangad ...	White pomfret.	18 miles ...	4 fathoms.	Sky clear, sea calm.
3rd Oct. ...	Tanur ...	Seir (C. guttatum).	4 miles ...	Surface ...	Sky clear, sea calm.
4th Oct. ...	Quilandi ...	C. longiceps ...	10 miles ...	......	Sky clear, sea calm.
4th Oct. ...	Beypore, South.	C. longiceps ...	2 miles ...	Surfaee ...	Sky clear, sea calm.
4th Oct. ...	Edakazhiyur...	White pomfret .	10 miles ...	......	Sky clear, sea calm.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
3 a.m. ...	Vakku vala.	59	......	......	F. 10 pies; S. 1 anna 2 pies each.	Shark; kora; cat fish; manthal.
8 a.m. ...	Thread ...	175	......	......	......	......
1 p.m. ...	Thread ...	109	......	......	......	......
1-30 p.m...	Thread ...	30	......	......	F. Rs. 8; S. Rs. 9 per 100.	......
2 a.m. ...	Vakku vala.	86	......	......	......	Shark; kora; cat fish; manthal.
11 a.m. ...	Peru vala.	Plentiful.	......	Young.	F. 5 pies per 100.	Manthal.
3 a.m. ...	Vakku vala.	594	Mud	Majority young.	F. Rs. 48; S. Rs. 65 per 100.	Shark; cat fish.
10 a.m. ...	Peru vala.	Plentiful.	......	Young ...	......	Kora.
Night ...	Rope ...	290	Small fishes ...	Majority young.	F. Rs. 4; S. Rs. 5-8-0 per 100.	Shark; cat fish; kora; mackerel.
7 p.m. ...	Rope ...	363	Mud	......	F. Rs. 48; S. Rs. 65 per 1,000.	Shark; skate; cat fish; pala; mackerel.
1 p.m. ...	Rope ...	82	Mud	......	......	Shark; cat fish.
Night ...	Rope ...	23	......	......	......	Shark; cat fish; kora; mackerel.
2 p.m. ...	Thread ...	23	......	Full grown.	F. Rs. 6-4-0; S. Rs. 8 per 100.	......
10 a.m. ...	Oda vala.	50	......	......	F. As. 4 per maund.	Shark; mullan.
9 a.m. ...	Thread ...	176	......	......	F. As. 2; S. As. 4 per 100.	......
1 a.m. ...	Rope ...	143	......	All young.	F. Rs. 3-8-0; S. Rs. 4-8-0 per maund.	Shark; cat fish.

APPEN

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899.					
4th Oct. ...	Blangad ...	White pomfret .	16 miles ...	3 fathoms.	Sky clear, sea calm.
4th Oct. ...	Chowghat ...	White pomfret .	20 miles ...	4 fathoms.	Sky clear, sea calm.
5th Oct. ...	Chowghat ...	White pomfret .	20 miles ...	4 fathoms.	Sky clear, sea calm.
7th Oct. ...	Chowghat ...	White pomfret .	20 miles ...	4 fathoms.	Sky clear, sea calm.
8th Oct. ...	Badagara ...	C. longiceps ...	8–10 miles.	Surface ...	Sky clear, sea calm.
8th Oct. ...	Chowghat	White pomfret .	20 miles ...	4 fathoms.	Sky clear, sea calm.
9th Oct. ...	Badagara ...	C. longiceps ...	8–10 miles.	Surface ...	Sky clear, sea calm.
9th Oct. ...	Ponnáni ...	C. lile ? ...	15 miles ...	......	Sky clear, sea rough.
9th Oct. ...	Chowghat ...	White pomfret .	18 miles ...	4 fathoms.	clear, sea calm.
10th Oct. ...	Badagara ...	C. longiceps ...	6-7 miles.	Surface ...	Sky clear, sea calm.
13th Oct. ...	Tanur ...	Seir (C. guttatum).	6 miles ...	Surface ...	Sky clear, sea calm.
18th Oct. ...	Quilandi ...	C. longiceps ...	12 miles ...	Surface ...	Sky clear, sea calm.
21st Oct. ...	Quilandi ...	C. longiceps ...	3 miles ...	2 fathoms.	Sky clear, sea calm,
21st Oct. ...	Kuttai ...	C. fimbriata ...	½ mile ...	Surface ...	Sky clear, sea calm.
21st Oct. ...	Mannalan-kannu.	C. fimbriata ...	2 miles ...	Surface ...	Sky clear, sea calm.
22nd Oct. ...	Puthu Ponnáni.	C. longiceps ...	2 miles ...	......	Sky clear, sea calm.
22nd Oct. ...	Veliyangode ...	C. longiceps ...	2¾ miles ...	Surface ...	Sky clear, sea calm.
23rd Oct. ...	Tanur ...	C. longiceps ...	1 mile ...	Surface ...	Sky clear, sea calm.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
Night ...	Rope ...	50	......	......	.....	Shark; cat fish; kora; mackerel.
7. p.m. ...	Rope ...	41	......	......	......	......
7 p.m. ...	Rope ...	372	Small fish ...	......	......	Shark; skate; cat fish; pala; mackerel.
7 p.m. ...	Rope ...	314	......	......	......	......
10 a.m. ...	Chala vala.	Plentiful.	......	......	F. 4 pies per 100.	Mackerel.
2 p.m. ...	Hemp ...	28	......	......	......	......
11 a.m. ...	Chala vala.	Plentiful.	......	......	......	Mullan.
4 a.m. ...	Thread ...	98	......	Full grown.	......	Shark; cat fish; manthal; mullan.
2 p.m. ...	Hemp ...	25	......	......	......	Shark; skate; cat fish; pala; mackeral.
9 a.m. ...	Chala vala.	Plentiful.	......	......	......	Mullan.
Night ...	Thread ...	186	......	Full grown; roe in some, not abundant.	F. Rs. 6-4-0; S. Rs. 7-8-0 per 100.	Shark; kora; mackerel; adu.
8 a.m. ...	Oda vala.	200	......	......	F. As. 6-6 per 1,000.	Mackerel.
9 a.m. ...	Oda vala.	80	......	......	F. As. 7 per 1,000.	......
4 p.m. ...	Thread ...	234	......	......	F. As. 4; S. As. 6 per maund.	Cat fish; kora; mullan.
2 p.m. ...	Thread ...	31	Mud	......	......	Shark; cat fish; mackerel.
11 a.m. ...	Vakku vala.	569	......	All young.	......	Shark; cat fish; mackerel; adu.
11 a.m. ...	Thread ...	134	......	......	......	Shark; cat fish; mackerel; adu; kora.
Noon ...	Thread ...	219	......	......	F.Rs. 4 per 6 maunds.	......

APPEN

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899.					
23rd Oct. ...	Chowghat ...	C. fimbriata ...	1 mile ...	.....	Sky clear, s calm
23rd Oct. ...	Kurikuzhi ...	C. fimbriata ...	200 yards .	......	Sky clear, sea calm.
23rd Oct. ...	Mannalan-kannu.	C. fimbriata ...	2 miles ...	Surface ...	Sky clear, sea calm.
24th Oct. ...	Quilandi ...	C. longiceps ...	1 mile ...	Surface ...	Sky clear, sea calm.
28th Oct. ...	Kurikuzhi ...	C. lile? ...	300 yards .	......	Sky clear, sea rough.
29th Oct. ...	Quilandi ...	C. longiceps ...	1 furlong.	2 fathoms.	Sky clear, sea calm.
31st Oct. ...	Pudiappu ...	C. longiceps ...	1 mile ...	......	Sky c ear, sea calm.
1st Nov. ...	Badagara ...	C. longiceps .	2–3 miles.	4 fathoms.	Sky clear, sea calm.
1st Nov. ...	Quilandi ...	C. longiceps ...	Less than 1 mile.	4-5 fathoms.	Sky clear, sea calm.
1st Nov. ...	Calicut, North.	C. longiceps ...	½ mile ...	Surface ...	Sky clear, sea calm.
1st Nov. ...	Tanur ...	Seir (C. guttatum).	6 miles ...	1 fathom.	Sky clear, sea calm.
1st Nov. ...	Ponnáni ...	Black pomfret...	8 miles ...	10 fathoms	Sky clear, sea calm.
2nd Nov. ...	Mannalan-kannu.	Seir	20 miles ...	2 fathoms.	Sky clear, sea calm.
2nd Nov. ...	Mannalan-kannu.	White pomfret.	20 miles ...	2 fathoms.	Sky clear, sea calm.
3rd Nov. ...	Chowghat ...	White pomfret.	16 miles ...	2 fathoms.	Sky clear, sea calm.
5th Nov. ...	Edakazhiyur.	Seir	11 miles ...	4 fathoms.	Sky clear, sea calm.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
2 p.m. ...	Thread ...	21	Mud	All young.	F. 6 pies; S. 8 pies per 100.	Mackerel; kora.
2 p.m. ...	Thread ...	41	......	......	......	Mackerel.
1 p.m. ...	Thread ...	48	Mud	....	......	Shark; cat fish; mackerel.
6–9 a.m. ...	Veechil vala.	40	......	......	F. As. 8 per 1,000.	......
1 p.m. ...	Thread ...	43	......	All young.	......	......
3 a.m. ...	......	200	......	......	F. As. 2; As. 4 per 1,000.	......
5 p.m. ...	......	57	......	......	F. As. 5; S. as. 5–6 per 1,000.	Mackerel.
6–11 a.m...	Veechil and oda vala.	Plentiful.	......	......	F. 4 pies per 100.	Shark; mackerel.
6–9 a.m. ...	Veechil vala.	30	......	......	......	Skate; mackerel.
2–4 a.m. ...	Veechil vala.	438	......	......	......	Shark; kora; mackerel.
2 a.m. ...	Olakal vala.	102	......	Majority full grown.	F. Rs. 6-8-0; S. Rs. 7-8-0 per 100.	Shark; kanayan.
4 a.m. ...	Vakku vala.	40	Mud	Full grown.	F. Rs. 5; S. Rs. 7-8-0 per 100.	Shark; cat fish; kora; mackerel.
7 p.m. ...	Vakku vala.	37	Small fish ...	......	F. Rs. 3; S. Rs. 4 per maund.	Mackerel; charu; kora; mullan.
7 p.m. ...	Vakku vala.	43	......	Full grown.	F. Rs. 2; S. Rs. 3 per maund.	......
2 a.m. ...	Vakku vala.	21	Small fish ...	......	F. Rs. 4; S. Rs. 5 per 100.	Shark; mackerel.
2 a.m. ...	Vakku vala.	62	Mackerel ...	......	F. Rs. 2-8-0; S. Rs. 3 per maund.	Mackerel; kora; cat fish; para.

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899.					
6th Nov. ...	Tanur ...	Seir	9 miles ...	1 fathom.	Sky clear, sea rough.
7th Nov. ...	Parpangadi ...	Seir	7 miles ...	8 fathoms.	Sky clear, sea calm.
7th Nov. ...	Tanur ...	Seir	7 miles ...	1 fathom.	Sky clear, sea rough.
8th Nov. ...	Quilandi ...	C. longiceps ...	¼ mile ...	Surface.	Sky clear, sea calm.
8th Nov. ...	Parpangadi ...	Seir	7 miles ...	8 fathoms.	Sky clear, sea calm.
8th Nov. ...	Tanur ...	Seir	6 miles ...	1 fathom.	Sky clear, sea calm.
8th Nov. ...	Vadanapalli ...	C. longiceps ...	1 mile ...	4 fathoms.	Sky clear, sea calm.
9th Nov. ...	Parpangadi ...	Seir	7 miles ...	10 fathoms.	Sky clear, sea calm.
9th Nov. ...	Kurikuzhi ...	C. longiceps ...	½ mile ...	......	Sky cloudy, sea calm, strong, S. W. wind.
10th Nov. ...	Kurikuzhi ...	C. longiceps ...	½ mile ...	......	Sky clear, sea rough.
11th Nov. ...	Parpangadi ...	Seir	7 miles ...	10 fathoms.	Sky clear, sea rough.
12th Nov. ...	Edakazhiyur.	Seir	9 miles ...	2 fathoms.	Sky cloudy, sea calm.
13th Nov. ...	Tanur ...	C. longiceps ...	3 miles ...	Surface ...	Sky clear, sea calm.
13th Nov. ...	Palapatti ...	C. longiceps ...	2 miles ...	Surface ...	Sky clear, sea calm.
15th Nov. ...	Ponnáni ...	C. longiceps ...	4 miles ...	5 fathoms.	Sky clear, sea calm.
16th Nov. ...	Tanur ...	C. longiceps ...	5 miles ...	Surface ...	Sky clear, sea calm.
17th Nov. ...	Tanur ...	C. longiceps ...	5 miles ...	Surface ...	Sky clear, sea calm.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
2–5 a.m. ...	Olakal vala.		......	A little milt.	......	Mackerel.
Midnight.	Hook and odavala.	29	Herrings ...	......	......	Shark; skate; mackerel; para; pala.
3–4 a.m ...	Olakal vala.	30	Mackerel ...	A little milt.	F. As. 12; S. As. 14 each.	......
2–5 a.m. ...	Veechil vala.	60	......	......	F. As. 2; As. 4 per 1,000.	Shark; mackerel.
Midnight.	Odavala.	78	Herrings ...	......	......	Pomfret; kora; pala.
1–4 a.m. ...	Olakal vala.	102	......	A little milt.	F. Rs. 7; S. Rs. 7–8–0 per 100.	......
2–4 p.m. ...	......	135	......	......	F. As. 3–6; S. As. 5. per 1,000.	Mackerel.
Midnight.	Odavala.	27	......	......	......	Shark; skate; pala.
3 p.m. ...	Thread ...	107	......	Full grown.	F. As. 12; S. Re. 1 per maund.	Mackerel.
Noon ..	Thread ...	124	......	A little milt.	......	Mackerel.
Midnight.	Hemp net.	23	......	Mid-sized.	F. As. 8; S. As. 10 each.	Shark; skate; kora.
3 a.m. ...	Vaku vala.	22	Mackerel ...	......	......	Shark; pala; mackerel.
4 p.m. ...	Noolu vala.	25	......	......	......	......
4 p.m. ...	Thread ...	49	......	......	F. As. 8; S. As. 12 per maund.	......
4 p.m. ...	Thread ...	20	......	......	F. As. 3; S. As, 5 per 1,000.	Shark; kora; cat fish; manthal; mackerel; adu.
1 p.m. ...	Noolu vala.	41	......	......	......	......
6 p.m. ...	Noolu vala.	78	......	......	......	......

APPEN

Date.	Yard.	Name of fish.	Distance from shore at which caught.	Depth at which caught.	Weather.
1	2	3	4	5	6
1899. 18th Nov. ...	Kuttai ...	C. longiceps ...	$2\frac{1}{2}$ miles ...	Surface ...	Sky clear, sea calm.
18th Nov. ...	Blangad ...	C. longiceps ...	6 miles ...	2 fathoms.	Sky cloudy, sea calm, S. W. wind.
18th Nov. ...	Veliyangode...	C. longiceps ...	3 miles ...	Surface ...	Sky clear, sea smooth.
19th Nov. ...	Kurikuzhi ...	C. longiceps ...	200 yards.	......	Sky clear, sea rough.
20th Nov. ...	Kurikuzhi ...	C. longiceps ...	500 yards.	......	Sky clear, sea rough.
20th Nov. ...	Edakazhiyur.	C. longiceps ...	4 miles ...	3 fathoms.	Sky clear, sea smooth.
22nd Nov. ...	Tanur ...	C. longiceps ...	5 miles ...	Surface ...	Sky clear, sea smooth.
28th Nov. ...	Calicut, North.	Seir	10 miles ...	3 fathoms.	Sky clear, sea smooth.
30th Nov. ...	Calicut, North.	Seir	9 miles ...	3 fathoms.	Sky clear, sea smooth.
30th Nov. ...	Chowghat ...	C. longiceps ...	2 miles ...	4 fathoms.	Sky clear, sea smooth.

DIX—*cont.*

Time of day at which caught.	Net used.	Catch maunds.	Stomach contents.	Adult or young; milt and roe.	Sale price.	Other fishes most plentiful.
7	8	9	10	11	12	13
4 p.m. ...	Rope net.	102	......	......	F. As. 5-6; S. As. 7-6 per maund.	Shark; skate; mackerel; kora.
1-4 p.m. ...	Thread ...	126	......	......	......	Shark; para; kora.
4 p.m. ...	......	156	......	......	......	......
1 p.m. ...	Thread ...	69	......	......	F. As. 5-6 S. As. 8 per 1,000.	Mackerel.
2 p.m. ...	Thread ...	69	......	......	......	......
4 a.m. ...	Thread ...	26	......	......	F. As. 6; S. As 10; per maund.	Mackerel; kora.
4. p.m. ...	Rope net.	102	......	......	......	Shark; skate; mackerel; kora.
6 a.m.—4 p.m.	Oda vala.	31	Mackerel ...	......	Rs. 40 per 100.	Mackerel (503 maunds).
10 a.m.—4 p.m.	Oda vala.	25	......	......	......	Mackerel (615 maunds).
3-5 p.m. ...	Thread ...	38	......	......	F. 6 pies; S. 10 pies per 100.	Mackerel.